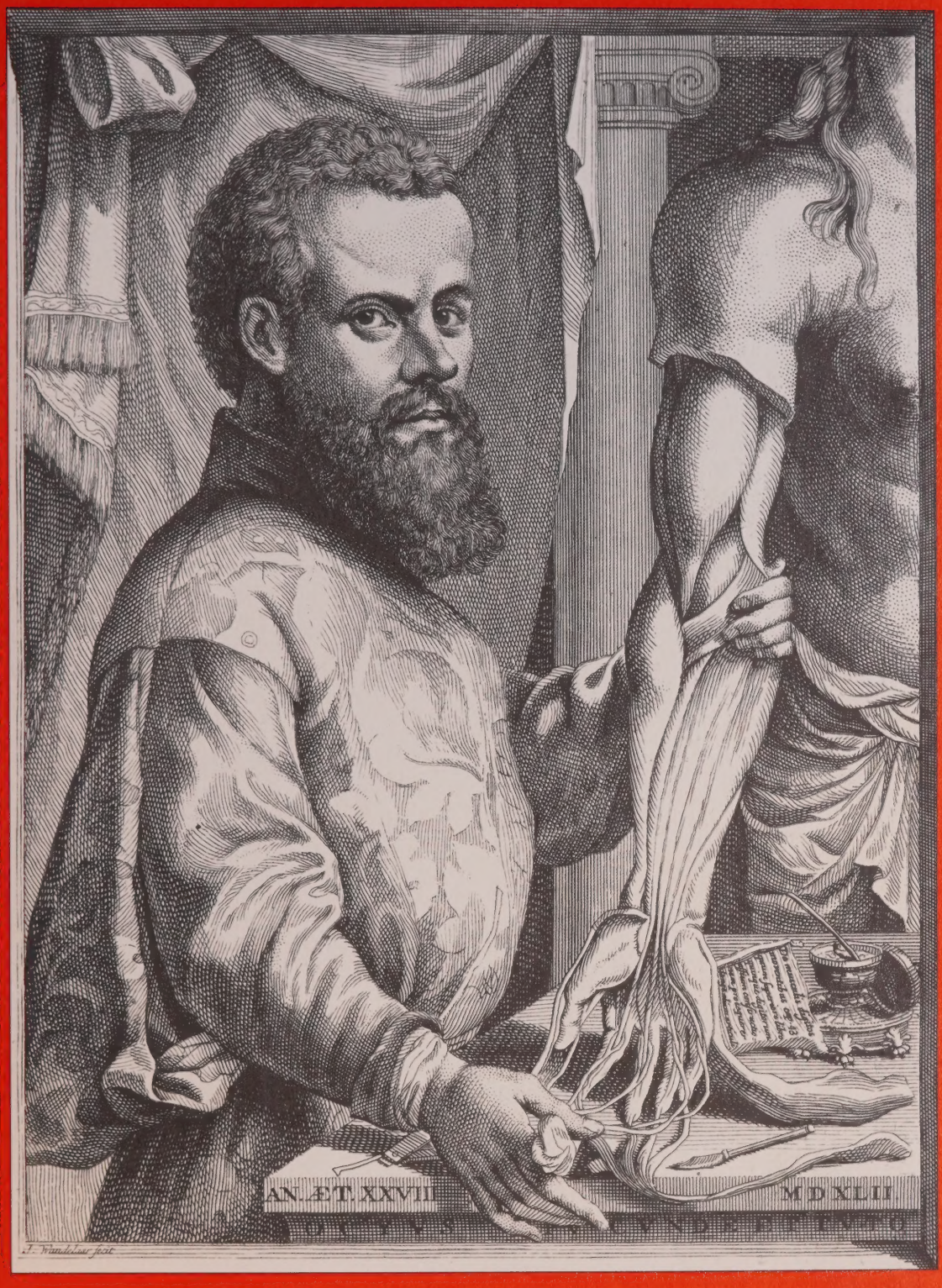

VESALIUS AT 500

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VESALIUS AT 500

an exhibition commemorating the
five-hundredth anniversary of the birth of Andreas Vesalius

Exhibition and catalogue by Philip Oldfield

Philip Oldfield

THOMAS FISHER RARE BOOK LIBRARY, UNIVERSITY OF TORONTO

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Front cover: Portrait of Vesalius engraved by Jan Wandelaar for Vesalius's *Opera omnia anatomica & chirurgica*. Leiden, 1725.
Back cover: the first skeletal figure from *De humani corporis fabrica*. Basel. 1543

Title page: the ornamental initial V was specially cut for the 1555 edition of *De Humani corporis fabrica*. It depicts Apollo flaying Marsyas, loser in a music contest between the two, presided over by the Muses.

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The Thomas Fisher Rare Book Library owns most of the books in this exhibition, others are borrowed from private collectors.
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PREFACE

When we were first approached by Dr Vogrincic in 2011 about whether the Fisher Library had an interest in being the repository for a special copy of the second edition of *Fabrica*, we little realized how momentous an opportunity was presenting itself. The confirmation by Dr Vivian Nutton that the annotations in that 1555 copy were genuinely by Vesalius, and the resulting scholarly interest in that copy dovetailed with the plans we already had to commemorate the five-hundredth anniversary of Vesalius's birth with a special exhibition in 2014. The exhibition has been ably curated by Philip Oldfield, History of Science and Medicine librarian at the Fisher Library, who has also written the accompanying catalogue.

The Fisher Library's medical holdings are impressive, but we have been able to supplement our own resources in a most remarkable way for this exhibition. In addition to the extraordinarily important annotated copy of the second edition, made available to us on deposit, we have been fortunate to collaborate with other private collectors, as well as Christopher Lyons of the Osler Library at McGill University. Our own collections together with the works on loan have enabled us to situate Vesalius within the long tradition of anatomical knowledge and teaching up to his time, as well as to present an almost complete set of Vesalius's own work. For example, from the Fisher's own collections the first edition of *Fabrica* and the German edition of the *Epitome* of the same year are being displayed alongside the Latin edition of the *Epitome* on loan from Dr Eugene Flamm, who has contributed a number of other important works to our exhibition. Stuart Rose has kindly lent the only other book known to have been annotated by Vesalius, Guenther's *Institutiones anatomicae*. Dr Brian Morrison has lent an example of one of the plates from a contemporary plagiarized edition of *Tabulae anatomicae sex*. In addition to the 1555 annotated copy of *Fabrica*, Dr Vogrincic has contributed other items from his collection including many of the portraits and the medals. When I saw the extremely scarce first edition of Mondino's *Anatomia* on sale by distinguished bookseller Jonathan A. Hill in New York earlier this year I knew that it would be a fabulous addition to our exhibition. Jonathan has very generously allowed us to put it on display, along with a sixteenth-century edition on loan from the Osler Library. I would also like to acknowledge the support and encouragement of Dr Zlatko Pozeg throughout the process of planning the exhibition. We are sincerely grateful to all those whose generosity has made it possible for us to put together what we hope is a fitting tribute to the life and work of 'the prince of anatomists'.

The influence of Vesalius continues to be felt today not only by those with an interest in the history of medicine, but also by anyone who admires the beauty of image and text as combined on the handsome folio pages of his most famous work. Generations of medical illustrators, including each year's new cohort from the University of Toronto's Biomedical Communications Department, marvel anew at the expressive portrayal of the human body, and Vesalius's passionate commitment to making that portrayal both accurate and beautiful.

Anne Dondertman
Director, Fisher Library

The redesigned woodcut title page to the 1555 edition of *De humani corporis fabrica*

The engraved title page of the 1725 edition of Vesalius's *Opera omnia anatomica and chirurgica*

VESALIUS AT 500

INTRODUCTION

This year we are commemorating the five-hundredth anniversary of the birth of one of the great figures in the history of medicine. The fame and significance of Andreas Vesalius rest almost entirely on one book, his monumental *De humani corporis fabrica,* first published in 1543. The *Fabrica* (as it is commonly referred to) is justifiably celebrated for its splendid woodcuts that introduced art into the sphere of anatomy, and set the standard for all future anatomical illustration. The enduring significance of the illustrations is attested to by the fact that they were still being copied and imitated two hundred years after their first appearance. In addition to its illustrations, the *Fabrica* also conveys a vitally important text, universally regarded as the cornerstone for the study and teaching of human anatomy. The new approach Vesalius introduced to the formal instruction of anatomy, and the methodology he developed for presenting anatomical information based on direct and accurate observation, were revolutionary in their consequences. In addition to its other merits, the *Fabrica* was also an excellent practical manual on dissection. The beautifully rendered woodcuts blend elegantly with the printed text, resulting in a masterpiece of the printer's art - the perfect marriage of text and illustration. The *Fabrica* is without doubt one of the splendours of Renaissance scientific book making.

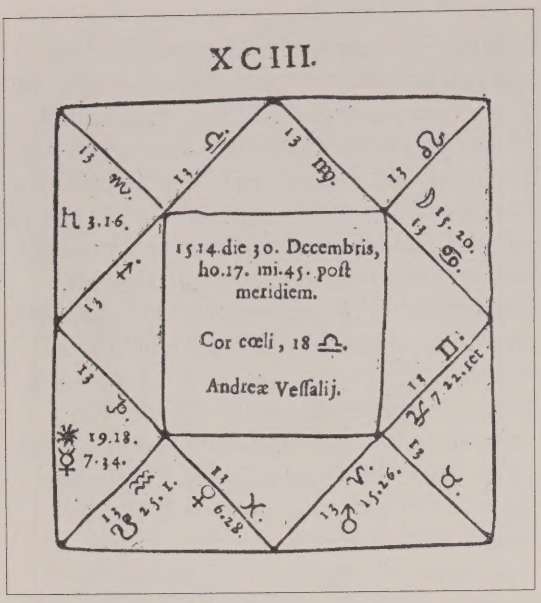
Yet despite the book's universal appeal, surprisingly little is known about its creator. The biography of Vesalius is somewhat sketchy, and there are large gaps in the narrative, particularly during his formative years, and in the final years of his life. What little we do know about him, especially regarding his medical education and career, is gleaned from his own remarks and observations found in his published writings. The testimony of his contemporaries helps to fill some of the gaps.

Andreas Vesalius was born André Van Wesele at the end of 1514, the second son of Andreas and Isabel Van Wesele. The family's original surname, Wijtinck or Witing, was subsequently changed to Wesele – a reflection of the geographical origin of their predecessors. The commercial centre of Wesel is located at the confluence of the Rhine and Lippe rivers in the Duchy of Clèves, a state within the Holy Roman Empire (modern North Rhine-Westphalia in Germany).

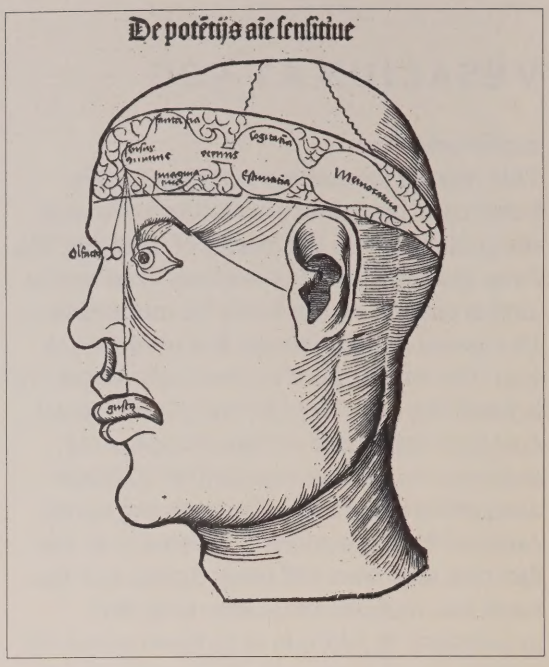
Vesalius was born into a family with a long medical pedigree. His great-great-grandfather, Peter Witing, had assembled a large medical library, and had written a commentary on the fourth *fen* of the encyclopaedic Latin version of the *Canon* of the Persian physician Avicenna. In his professional capacity Witing had attended Emperor Friedrich III (1415-1493). Vesalius's great-grandfather, Johannes (d. 1476), had also been in royal service as physician to Mary of Burgundy (1457-1482), wife of the future Holy Roman Emperor Maximilian I (1459-1519). Johannes is recorded under the Latinized form of his name, Johannes de Wesalia, in the register of the University of Leuven [Louvain] where he taught medicine, before being appointed city physician of Brussels around 1447. It was during Johannes's lifetime that the family surname was changed from Witing to Van Wesele.

Johannes's eldest son, Everard, followed in his father's footsteps by becoming physician to Mary of Burgundy, and to her husband the regent of the Netherlands, Archduke (from 1508 Emperor) Maximilian I, and their children. Everard also wrote a commentary on the medical writings of Rhazes, (Abū Bakr Muḥammad ibn Zakariyā Rāzī (854-925)) and on the first four parts of the *Aphorisms* of Hippocrates.

Andreas, the father of Vesalius, was the illegitimate son of Everard. He was trained as an apothecary and entered the imperial service of the Holy Roman Emperor Charles V (1500-1558) in that capacity. At an unknown date Andreas married Isabel, daughter of Jacob Crabbe, a tax-collector of Brussels, and Catherine Sweerts. As part of his daughter's dowry, Jacob Crabbe provided a house on Helle Straetken in the Haute Rue quarter, located in the southern part of Brussels. It was here that Vesalius was born in 1514. In the same house his elder brother Nicolas, his younger brother Franciscus, and sister Anne were also born. The house was demolished in 1621. On its site now stands *L'église Saints-Jean-et-Étienne-aux-Minimes*. If we are to believe the testimony of the brilliant mathematician, astrologer, and physician, Girolamo Cardano (1501-1576), who cast Vesalius's horoscope in 1547, the anatomist was born at 05:45 on the morning of 30 December. At the time of Vesalius's birth Brussels was one of the principal cities of the renamed Duchy of Brabant, which on the death of Mary of Burgundy in 1482 became known as the Habsburg Netherlands.



Cardano's horoscope of Vesalius



EARLY EDUCATION

On the details of Vesalius's early life there is practically no information. The family home in Brussels was close to a place known as Gallows Hill *(Galgenberg)*, where executed criminals were exposed to the elements; the site is now occupied by the *Palais de Justice*. From Vesalius's own testimony we know that as a boy he dissected small animals such as rats, mice, moles, and an occasional cat or dog. It is likely that the young Andreas attended the elementary school run by the Brethren of the Common Life *(Fratres Vitae Communis)*, but there is no documentary evidence to support this assumption. On completion of his elementary schooling, Vesalius moved to Leuven in February 1530 to prepare himself for university. The University of Leuven at that time consisted of a group of colleges, known as *pedagogia*. Vesalius entered the college known as the Castle School (*Pedagogium Castrense*), where the curriculum was designed for students taking the degree of Master of Arts, a prerequisite for entry into a professional school. Latin and Greek, rhetoric, and philosophy were obligatory subjects. Among Vesalius's fellow students was Antoine Perrenot de Granvelle (1517-1586), the future statesman and Primate of the Netherlands, who also became chancellor to the Emperor Charles V, and to King Philip II of Spain. While pursuing his studies at the Castle School, Vesalius also attended courses at the College of Three Languages [*Pedagogium Trilingue*], established in 1517 by the humanist Jeroen van Busleyden (1470-1517), a close friend of Erasmus (1466-1536). At the College, Vesalius developed his competence in scholastic Latin, and mastered classical Greek, as well as acquiring a rudimentary knowledge of Hebrew. From his schooldays Vesalius recalls reading Aristotle's *De anima*, and Gregor Reisch's encyclopaedic compendium, the *Margarita philosophica*. In particular he recalls the diagram of the human brain indicating the five senses.

UNIVERSITY OF PARIS 1533-1537

Vesalius's decision to pursue a medical career was taken on the advice of a family friend, Nicolas Flourens, who had also studied at Leuven, before becoming physician to the Emperor Charles V. In his first published work, *Paraphrasis in nonum librum Rhazae medici arabis clariss. ad Regum Almansorem* (1537), Vesalius acknowledges his indebtedness to Flourens by dedicating the *Paraphrasis*, as well as a later work, known as the *Venesection Letter* of 1539, to the "patron of my early studies." It is also likely that Flourens urged the young Vesalius to pursue his medical studies at the prestigious University of Paris, considered at that time to be the leading medical school outside of Italy.

By September 1533 Vesalius had arrived in Paris, where he took up lodgings with an old friend from Leuven, Jean Sturm. Vesalius was nineteen years of age – too young to be awarded the Masters of Arts, although he had completed all the degree requirements. Under such circumstances the university administration usually admitted the candidate, deferring award of the degree until a later date. Vesalius duly registered as a candidate *(philiater)* for the baccalaureate in medicine.

The statutes of the medical faculty at the University of Paris, established in 1350, had changed little over the next two centuries. Members of the Faculty of Medicine who

taught regular courses were known as regent doctors; they also presided over academic disputations and theses. Students were expected to follow a demanding curriculum. Courses ran every day from early morning, except on Thursdays and certain feast days, from the second week of November until 28 June, for thirty-six months spread over four years. The curriculum consisted of lectures in Latin covering the main medical disciplines of pharmacy, physiology, surgery, pathology, botany (*materia medica*), anatomy, hygiene, and therapeutics, as expounded in the writings of Hippocrates, Galen, Avicenna, Averroes, Avenzoar, Rhazes, and the scholars of the *Schola Medica Salernitana*. In addition two specially elected regent doctors, known as professors-in-ordinary, supplemented the so-called ordinary lectures with more detailed daily lectures. Candidates for the baccalaureate in medicine were also employed as instructors, who were required to give lectures or papers *(cursus)* on a variety of medical themes.

ANATOMY AT PARIS

Although the study of anatomy became a requirement for medical candidates at Paris from the late fifteenth century, prior to 1478 very little dissection had actually taken place. Surviving records report a dissection being carried out in 1407, but there are no further references until 1478. Anatomy did not yet enjoy the status of an independent discipline, and was regarded as a mere adjunct to surgery. As such, it came under the purview of the surgeon or barber, rather than the physician, who regarded dissection with some distaste. Members of the Guild of Surgeons of Paris and barbers, being excluded from the Faculty of Medicine, had established their own schools, though they did attend and even participated in dissections carried out at the University. But they were always considered subservient, and did not enjoy the same status or privileges as the physicians, and had no say in the teaching of anatomy at the University.

As a result, anatomical instruction in Paris lagged behind the teaching of the subject in Italy, where surgeons were admitted into the universities. In general French medical practitioners were uninformed about Italian medicine, and there was a distinct lack of contact between the conservative French universities and their progressive Italian counterparts. But the tide was beginning to turn, as the spirit of a new classical scholarship took root.

GALEN AND ANATOMY

From the third century right up to the seventeenth century the study and practice of medicine in all its branches were dominated by the writings of Galen (129-ca. 216 CE), the spiritual successor of Hippocrates (circa 470-360 BCE).

The extremely prolific Galen wrote on all aspects of medicine. Throughout the medieval period, it was mainly Galen's works on physical medicine and therapeutics that were copied, circulated, and closely studied by Arab and Byzantine scholars, resulting in a large number of commentaries and translations into Syriac, Arabic, Hebrew, and Latin. At a time when little importance was attached to the study of the body's structure (despite Galen's frequent exhortations about the crucial role of anatomy in the study of medicine), his anatomical writings were of no practical interest to physicians, and were largely neglected and even forgotten. The resulting decline in anatomical investigation was to persist throughout the medieval period. From the third century CE until the dawn of the Renaissance, dissection was little practiced in Byzantium or the Islamic lands, and had all but disappeared. Most physicians were satisfied with a modicum of anatomical knowledge in order to treat wounds, and to perform simple surgical procedures, dislocations, and fractures.

As Vesalius reminded readers of the *Fabrica*, anatomy had been an important subject of study in ancient Alexandria in the third century BCE, and human dissection had been widely practiced. Herophilus (circa 335-circa 280 BCE), a member of the Alexandrine school, was reputed to have been an expert dissector, and the author of a number of medical works, including a treatise on anatomy, long since lost. Both he and Erasistratus of Ceos (active circa 280 BCE) were believed to have performed dissection and even vivisection on condemned criminals.

There is no evidence that Galen ever performed human dissections during his time in Alexandria. In his writings he urged practitioners to undertake dissections as frequently as they could, even though this opportunity was denied to Galen himself, for in Asia Minor where he spent his early professional life, dissection was forbidden by law. Elsewhere the practice of human dissection was hampered by religious scruples, legal restrictions, social taboos, and the general unavailability of cadavers.

Contrary to common belief, the attitude of the Church to dissection was one of tacit tolerance rather than outright condemnation. Provided the corpse was treated with dignity, and was given a Christian burial (if appropriate), the

Church raised no objections to the practice of dissection. After all, viewed from a theological standpoint, dissection revealed the wondrous design and wisdom of the Creator. The ecclesiastical authorities, on the other hand, were quick to condemn as sacrilegious the robbing of graves to procure anatomical specimens. Human vivisection was also vigorously condemned. The Islamic attitude to human dissection was slightly more complex and inconclusive. Nowhere in the *Qur'an* is dissection explicitly proscribed, though mutilation and the breaking of bones are forbidden, as is the desecration of graves. Without specific interdictions against dissection, the legal Islamic authorities acted indecisively. If the cadaver to be dissected was that of a non-Muslim, there was no opposition. But if the corpse was that of a Muslim, the situation was quite different, and the authorities could intervene, though there is no evidence that they actually did.

Even though the religious authorities did not explicitly condemn dissection, there was a general sense that opening a cadaver was a sacrilegious and barbaric act. The sight of blood and gore, and the stench of putrefaction impeded the development of anatomical research. And if considerations of morality and squeamishness were not major concerns, there was still the imagined threat of contagion.

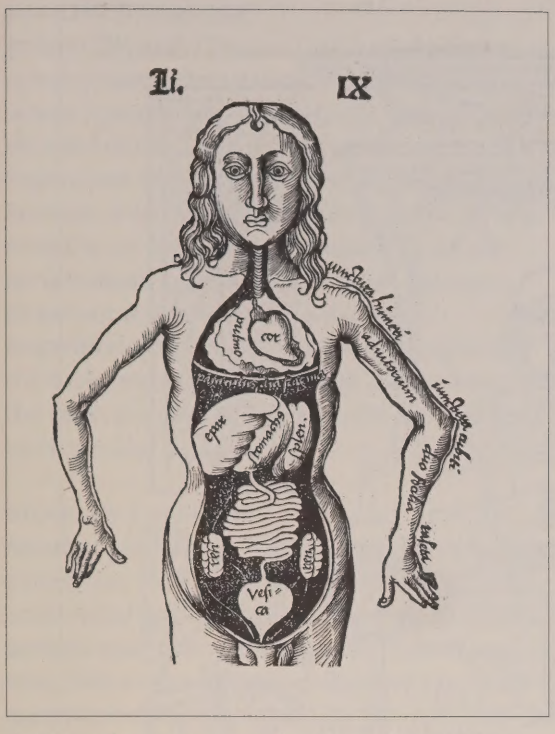
Several alternative means for gathering anatomical knowledge were available. Much information could be gleaned from the living body, such as the eruption of the wisdom teeth, the pulse, nerve sensations, and anatomical anomalies such as double joints. Vital anatomical information might also be acquired through the examination of deep wounds in dead and living bodies. As physician to the Gladiator School in Pergamum, Galen had ample opportunity to examine wounds, but he regarded this as inadequate for the real study of the human body, as it only provided details of surface anatomy. The dissection of animals, particularly the Barbary ape (*Macaca sylvanus*), whose anatomy, Galen claimed, closely resembled that of humans, provided the greatest source of anatomical information. Other animals exploited for dissection were dogs and pigs. A much rarer source of anatomical specimens was the unburied corpses of outlaws who had been exposed on mountainsides, to be devoured by birds or wild animals. The cadavers of stillborn or aborted fetuses provided yet another source of specimens.

ANATOMY AND DISSECTION

With the founding of universities in Europe in the eleventh century, public dissections were gradually introduced into the curricula. The first public dissection took place at the University of Bologna in 1307. Public dissections continued at Bologna throughout the fourteenth century, and became a standard part of the medical curriculum thereafter, and were incorporated into the university's statutes in 1405. The earliest recorded dissection to have taken place at the University of Padua is 1341. The statutes of 1465 made provision for a public dissection to take place annually before an audience of teachers and a limited number of students. At Venice public dissections began in 1368, at Florence in 1388, and later in several other Italian university cities. Outside of Italy officially approved dissections were granted every other year to Montpellier in 1340, and annually to Vienna in 1404, Prague in 1460, Paris in 1478, and Tübingen in 1485.

In Bologna, as in other institutions of medical education, public anatomical demonstrations followed a standard format that had been in effect since the early fourteenth century. In a temporarily erected theatre, proceedings were presided over by an instructor or *lector*, who sat in his chair (*cathedra*) reading aloud the prescribed Latin text, and making the occasional additional comment. The specimen to be dissected, usually an executed criminal, was laid out supine on the dissecting table, while those in attendance crowded around. The dissection itself was often spread over three or four days, and was performed by a surgeon or barber, while an *ostensor* pointed out the parts being discussed. The whole ritualized procedure was designed to demonstrate anatomy in accordance with the writings of Galen; its purpose was not to verify the text against the evidence of the body, or to discover new anatomical structures. The model made no allowance for debate or close individual investigation by the students, and was more of a rigid academic ceremony with little didactic benefit. The sheer size of the audience, which could number several hundred, disallowed any close intimate study. This format for dissection was maintained right up to the time of Vesalius, and even beyond. It is hardly surprising, therefore, that the teaching of anatomy stagnated.

For almost two thousand years anatomical procedures were based on the doctrine of the three venters, derived from the teachings of Plato (circa 428-circa 347 BCE). In the *Timaeus* Plato attempted to explain the nature and purpose of the physical world, and the creation of the universe. He had neither interest nor experience in physical anatomy, and was concerned only in the philosophical significance of the body,



depiction of the three venters from Gregor Reisch's *Margarita philosophica*, 1508

which for him was the vehicle of the soul, the result of intentional design by a superior Being.

According to Plato, the body consists of three cavities, or venters, separated by the natural demarcations of neck and diaphragm. The lower venter, extending downwards from the diaphragm to the pubic bone, contains the abdominal viscera. The middle venter, between the neck and the diaphragm, is home to the heart and lungs. The higher region, above the neck, houses the brain. This arrangement of abdomen, chest, and brain corresponds to the three bodily functions – nutritive, vital, and sensitive - and was an integral part of the humoral theory of medicine. The veins carried nutriment from the liver to the rest of the body; the arteries distributed blood and spirit from the heart, while the nerves carried senses to the brain and motion from the brain to the muscles.

Although originally a philosophical doctrine, the three venter division also provided a practical means for organizing anatomical procedures. In the context of dissection, it was expedient to open the lower venter first, as the viscera were the most susceptible to rapid decomposition. Once the viscera had been dealt with, the organs of the middle venter were examined, and finally the brain in the upper venter.

PRE-VESALIAN ANATOMICAL WORKS: MONDINO DEI LUZZI

Anatomical treatises were not unknown before the fourteenth century, but they merely formed part of larger works of surgery. *Anatomia*, the textbook prepared by Mondino de Luzzi (circa 1270–1326) in 1316 for use by his students, is regarded as the first book devoted entirely to anatomy, and became the standard manual of anatomical dissection for the next two hundred years. The practical method of dissection, advocated by Galen, was followed by Mondino, who in 1306 became the inaugural Professor of Practical Anatomy at the University of Bologna.

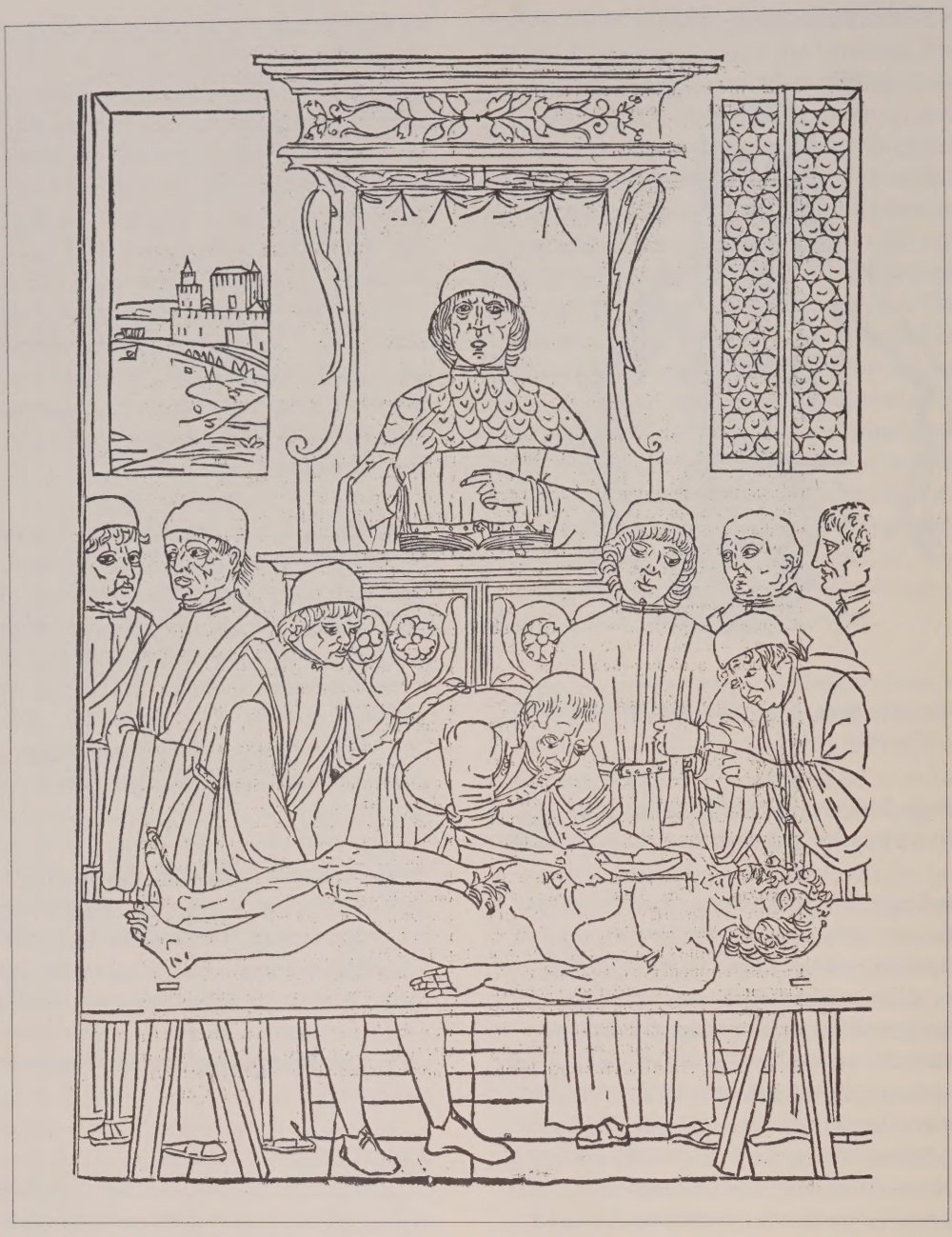
Although Galen's doctrines were well established in European universities by the start of the fourteenth century, the Galenic anatomical texts available to Mondino in preparing his textbook, were few and far between, and were mostly incomplete or corrupt. He had to rely on abridged versions of *De usu partium* [On the Use of Parts] and of *De locis affectis* [On Affected Parts], and a few other fragmentary texts.

By the end of the fifteenth century the few anatomical illustrations that existed were of little significance. They were not intended to be realistic depictions of what was seen, but were rather mnemonic representations of what tradition demanded. Moreover, illustrations were used haphazardly, with no direct relationship to the text.

FASCICULUS MEDICINAE

This kind of illustration is evident in the *Fasciculus medicinae*, sometimes attributed to Johannes de Ketham. First published at Venice in 1491, it was reprinted several times during the final years of the fifteenth century and the early decades of the sixteenth century. The *Fasciculus* is the earliest printed book to include anatomical illustrations of any significance. The full-page woodcuts reveal the state of medicine at the end of the medieval period. They are schematic, and contributed little to the advancement of anatomical knowledge. The illustration in the *Fasciculus* of a dissection in progress is of considerable interest, as it depicts the format of anatomical demonstration employed throughout the fourteenth and fifteenth centuries.

By the second decade of the sixteenth century other illustrated anatomical texts that displayed a more sophisticated approach to the subject were printed. The most important works were those by Jacopo Berengario da Carpi, and Johann Dryander.



Woodcut of a dissection from the early sixteenth century, from the *Fasciculus medicinae* of 1522. In the centre is the instructor seated in an elevated chair, reading the prescribed anatomical textbook. In the lower centre the dissection is performed by a barber or surgeon while the figure on the right, the ostensor, points to the various anatomical parts being discussed.

JACOPO BERENGARIO DA CARPI

Jacopo Berengario (1460-1530) completed his monumental *Commentaria cum amplissimis additionibus super Anatomia Mundini* in 1521. This commentary on Mondino's textbook provided a complete guide to earlier anatomical writings, and was Berengario's most significant contribution to anatomical knowledge. A much condensed version of the *Commentaria*, entitled *Isagogae breves*, was issued in 1522 in a small quarto of eighty leaves, richly illustrated with woodcuts. It was republished, with changes and revisions, in 1523, 1530, and 1535.

In several respects Berengario anticipated Vesalius. He was one of the first to challenge the ancient authority of Galen. He produced a useful manual of dissection that superseded Mondino's, and was the best work of its kind before the *Fabrica*. He was also a strong advocate of private dissection, and was one of the first anatomists to understand that verbal descriptions were sometimes insufficient to clarify complex anatomical structures, which were best served through illustration. Some of the woodcuts are crudely rendered, but they were adequate for Berengario's purposes in the 1520s. As anatomical knowledge grew, the need for more accurately drawn and minutely detailed illustrations was acutely felt, and was eventually realized in the magnificent woodcuts of Vesalius's artist.

JOHANN DRYANDER

Johann Dryander (1500-1560) had planned a comprehensive treatise on the anatomy of the whole human body, but only the first part, devoted to the head, was issued. It appeared in September 1536 with the title: *Anatomia capitis humani*. A second edition followed in June 1537 with the revised title *Anatomiae, hoc est, corporis humani dissectionis pars prior.* Twenty-three woodcut illustrations present a sequential dissection of the head, along with the tools necessary for the task. Dissection of the neck, the base of the skull, the jaw and the teeth are also depicted.

CHARLES ESTIENNE

Another precursor of Vesalius was Charles Estienne (circa 1505-1562), whose richly illustrated anatomical volume, *De dissectione partium corporis humani libri tres,* eventually appeared in 1545, following a six-year delay over a legal dispute between Estienne and his surgical assistant Etienne de la Riviere. The curious woodcuts of this beautifully printed book are not as anatomically sophisticated as those in the *Fabrica*, yet do display a certain artistry and originality.

THE GALENIC REVIVAL

When Vesalius arrived in Paris, the recovery of Galen's texts, a trend that had begun in Italy towards the end of the fifteenth century, was in full swing. One of the leaders of the Galenic revival in Italy was Niccolò Leoniceno (1428-1524), professor of medicine, mathematics, and philosophy at the University of Ferrara, whose personal library was renowned for its rare and extensive collection of Greek medical and scientific manuscripts. Finding the Latin translations of Galen to be riddled with errors and inaccuracies, Leoniceno strongly advocated a return to original Greek sources.

As more of the writings of Galen were discovered in Greek manuscripts, and in Latin translations of the numerous Arabic versions that circulated in manuscript, the restoration of the Galenic canon reached a highpoint in 1525, when the first Greek edition of his known writings was published by the heirs of Aldo Manuzio in Venice. Other editions in Greek soon followed, including the important edition in seven volumes, printed by Andreas Cratander at Basel in 1538. New Latin translations of Galen also began to proliferate. Initially publication focused on Galen's writings on practical medicine, therapeutics, and hygiene, which had been preserved in large numbers in Arabic and Latin translations. But in the years immediately prior to Vesalius's arrival in the French capital, attention began to shift to Galen's hitherto unknown or forgotten writings on anatomy.

In 1514 Leoniceno's Latin translation of a small collection of Galen's writings was printed by Henri Estienne in Paris, and in 1528, Estienne's son-in-law Simon de Colines, printed Leoniceno's Latin version of *De motu musculorum* [On the Movement of the Muscles].

Of the twenty-six surviving Galenic works dealing with anatomy and physiology, the most important were *De usu partium corporis humani* and *De anatomicis administrationibus* [On anatomical procedures]. The former was available throughout the Middle Ages in a variety of abridged or corrupt copies. In the early fourteenth century it became better known thanks to the Latin translation by Niccolò da Reggio (b. 1280) that was later printed at Paris by Simon de Colines in 1528. *De anatomicis administrationibus* was rediscovered only in 1528.

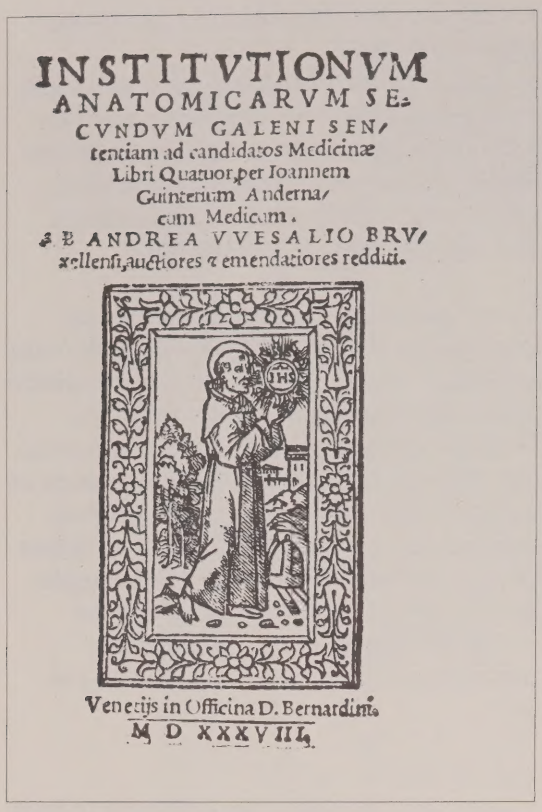
GALEN AND PARIS

The leading Galenists at the University of Paris in the 1530s were Johann Guenther of Andernach (1505-1574), and Jacobus Sylvius (1478-1555), two of the most influential teachers of anatomy during Vesalius's student years at Paris. Following Leoniceno's lead, both men immersed themselves in translating Galen into Latin. Guenther alone translated more than forty Galenic texts, including *De anatomicis administrationibus*.

As the influence of the newly recovered Galenic texts began to spread, Galen's anatomical writings formed the basis for the study of anatomy at several European universities, including the University of Paris. But the enthusiasm for Galen demonstrated in Paris soon developed into a new conservatism. Members of the Faculty, particularly Guenther and Sylvius, displayed a blind enslavement to Galenic doctrines, which put paid to any free academic enquiry in the sphere of anatomy. For these zealots Galen was infallible, and his writings sacrosanct.

Significant changes in dissecting procedures were soon introduced at Paris. Much more attention was devoted to the bones and muscles in contrast to previous anatomical practice, which concentrated on the viscera of the three venters. In *De anatomicis administrationibus* Galen again stressed the importance of the skeleton as the foundation of the structure of the body and the muscles as its moving agents.

One of Guenther's most influential works was *Institutionum anatomicarum secundum Galeni*


INSTITVTIONVM
ANATOMICARVM SE-
CVNDVM GALENI SEN-
tentiam ad candidatos Medicinæ
Libri Quatuor, per Ioannem
Guinterium Andernа-
cum Medicum.
AB ANDREA VVESALIO BRV-
xellensi, auctiores & emendatiores redditi.
Venetijs in Officina D. Bernardini.
M D XXXVIII.

sententiam ad candidatos medicinae libri quatuor, a succinct survey of Galen's writings for medical students that at the same time provided a manual for dissection. First published at Paris in 1536, and again at Basel the same year, Guenther's textbook was used by Vesalius as a guide in preparing his 1538 publication, *Tabulae anatomicae sex*. Vesalius found certain discrepancies between what Galen had allegedly written, and the observable facts. Believing the errors to be Guenther's and not Galen's, Vesalius set about amending Guenther's text, and correcting the large number of typographical errors. The revised edition, with Vesalius's name on the title page, was published in Venice in 1538. Although Vesalius's name does not appear on the title page of Guenther's original edition of 1536, in a passage concerning the seminal vessels, the author refers to his student by name in glowing terms:

> It [the seminal vessel] was only recently found with the help of Andreas Vesalius, son of the Emperor's pharmacist, a young man, by Jove, of great promise, possessing a singular knowledge of medicine, erudite in both languages [Latin and Greek] and most skilled in dissecting bodies ...

But contrary to Guenther's generous acknowledgement, the discovery was not in fact new, and had been known to Italian medicine for several hundred years. The vessels were familiar to Mondino, Berengario, and Massa, and had, moreover, been described by Galen in *De anatomicis administrationibus*, which, although lost until the sixteenth century, had survived in Arabic translations. Ignorance of this fact demonstrates the unfamiliarity in Paris with Italian anatomical writings. Also telling is the fact that Vesalius did not correct the erroneous attribution in his revised edition of the *Institutiones anatomicae*.

Sylvius, too, worked diligently on arranging, organizing, and abstracting the vast and growing corpus of the writings of Galen. He produced a series of synoptic tables and other aids designed to help students navigate their way through the newly published ancient texts. His endeavours were much appreciated by his students, including Vesalius. Despite a relatively late start in medicine, Sylvius became an academic instructor at the age of fifty-three, and enjoyed both success and popularity. Two of his works, *Ordo, et ordinis ratio in legendis Hippocratis et Galeni libris* (1541) and *In Hippocrates et Galeni physiologiae partem anatomicam isagoge* (1542), although published after Vesalius had left Paris, represent Sylvius's teaching from 1531. Both Guenther and Sylvius also played a major role in developing and popularizing "new" Latin anatomical terminology.

Vesalius later criticized the conservative nature of anatomical instruction in Paris, but at first he enjoyed a cordial relationship with his teachers. On several occasions Vesalius claims to have learned practically nothing from Sylvius on human anatomy, but he does acknowledge his teacher's superior knowledge of the Galenic canon, and recognized the value of his lectures on dissection. Vesalius was also grateful to Guenther for teaching him the rudiments of dissection, even if Guenther did none of the dissecting himself. Instead, he allowed his students to carry out the work – an opportunity seized upon by Vesalius, ever eager to improve his dissecting skills, so admired by Guenther. At this point there were no obvious signs of Vesalius's later animosity towards his teachers or to Galen's methods. He belonged very much in the Galenic camp, and remained so for several years after his departure from the French capital.

The formal dissections performed by Vesalius under supervision were supplemented by nocturnal excursions to the cemeteries of Paris, where he often had to fend off vicious dogs to recover human bones for private study. His osteological knowledge became so proficient, that he claimed even when blindfolded, to be able to identify a bone by touch. Another source for anatomical specimens were executed criminals whose corpses were left to rot on the gallows– a sight familiar to Vesalius since his childhood at Gallows Hill. Vesalius conducted

private anatomical sessions in his own rooms with privileged colleagues. Sometimes bodies were kept in his bedroom for several weeks.

BETWEEN PARIS AND PADUA

Vesalius was not destined to complete his studies at the University of Paris. In July 1536, shortly after he had fulfilled the third year of the curriculum, French forces under King Francis I (1494-1547) invaded the Duchy of Savoy, provoking a strong military response from the forces of the Holy Roman Emperor, Charles V who sent two armies, one into Provence, the other into northern France, to dislodge the French. As an alien Fleming, Vesalius, fearing reprisals, decided to leave Paris, and return to the relative academic backwater of Leuven, where he was dismayed to find that medical studies had stagnated. Members of the Faculty of Medicine, ignorant of ancient Greek medicine, were still entrenched in the medieval doctrines of the Arabs. Only one teacher met with Vesalius's approval – Johannes Heems of Armentières (d. 1560) to whom he later dedicated his revised edition of Guenther's *Institutiones anatomicae*. Although no dissection had been undertaken at the University since 1518, the reputation Vesalius had earned while studying in Paris had reached Leuven, where he was granted permission to conduct his own anatomical demonstrations, including dissections. Vesalius also continued to carry out his own private dissections. He related how once he came across a skeleton, stripped of its flesh by birds, in the ditch along a country road. With the connivance of the civic authorities, he succeeded in smuggling the bones into his lodgings where he re-assembled the skeleton.

While at Leuven Vesalius completed the requirements for the degree of bachelor of medicine. In February 1537 he published his bachelor's dissertation, *Paraphrasis in nonum librum Rhazae medici arabis clariss. ad Regum Almansorem,* a revision and commentary of the Latin translations of the work written for King Almansur of Khurasan, by the Arab-Persion physician, Rhazes. Vesalius undertook a revision of the ninth book of the *Ad Almansorem*, making stylistic changes and improvements, and adding a commentary to the Latin translation of Rhazes.

During the first few decades of the sixteenth century, scholars attempted to purge medicine of what were considered to be barbaric Arab influences, and to restore medicine to its "pure" ancient Greek roots. Part of Vesalius's purpose was to re-write Rhazes's text in a more elegant Latin, that would replace the coarse style and "barbaric" words that Arab authors had introduced into their medical treatises. Although Vesalius was later to view Arab medicine more favourably, for the time being he was prepared to acknowledge the contributions to medicine by Arab physicians, but only insofar as they were in keeping with the writings of Galen.

PADUA

Rather than complete his degree of Doctor of Medicine in Leuven, Vesalius chose to transfer his studies to the University of Padua, at that time renowned as the primary medical school in Italy. In December 1537 he successfully passed his entry examinations, and within days was appointed demonstrator (*ostensor*) and lecturer in surgery and anatomy (*explicator chirurgiae*) by the Senate of the Republic of Venice, under whose rule Padua had been since 1406.

Although dissections at the University of Padua had been performed since 1341, they were carried out infrequently, usually once a year, and the number of students allowed to attend was strictly limited. Dissections, which could last several weeks, were usually performed in December, when the rate of decomposition was slower. Public anatomical demonstrations were performed in the manner set out by Mondino at Bologna in the early fourteenth century, but Vesalius was about to change all that. As lecturer in surgery and anatomy he was granted the freedom to revise the procedures for anatomical demonstration as he deemed fit. The fundamental changes that he introduced totally transformed the presentation of anatomical demonstrations henceforth.

TABULAE ANATOMICAE SEX, 1538

A significant innovation introduced by Vesalius was the use of illustrations to accompany his lectures, and to serve as *aides-mémoire*. The large illustrations in the form of charts were so successful among the students, that Vesalius was encouraged to produce a set of charts that became known as the *Tabulae anatomicae sex.*

Three of the figures were drawn by Jan Stefan van Calcar (circa 1499-circa 1546), a fellow countryman of Vesalius, who had migrated to Venice to study art in the school of Titian. The two Flemings probably met in Venice where Vesalius had stayed during his journey to Padua. Stefan's name appears in the colophon of the sixth *Tabula* – "*sumptibus Ioannis Stephani Calcarensis*," suggesting that the artist had either financed the enterprise, or was being recompensed for his labour with the proceeds from sales of the charts. Stefan's skeletal draw-

ings, though not free from error, were a considerable advance on previous depictions by other artists.
Besides their directly practical purpose, the *Tabulae anatomicae* were essentially a preliminary trial for "something more considerable" that was taking shape in Vesalius's mind: the *De humani corporis fabrica*.

The innovative combination of text and illustration in the *Tabulae anatomicae* was a major milestone in anatomical teaching. The *Tabulae anatomicae* also represent a significant turning point in Vesalius's career, as he begins to challenge the authority of Galen for the first time. It was while he was checking Galen's text against that of Guenther's *Institutiones anatomicae* that Vesalius came to the realization that Galen had based his anatomical dissections on animals, usually apes, extending his conclusions by analogy to human beings. This uncomfortable discovery was not mentioned in the *Tabulae anatomicae*, but five years later, a more confident Vesalius wrote in the *Fabrica*

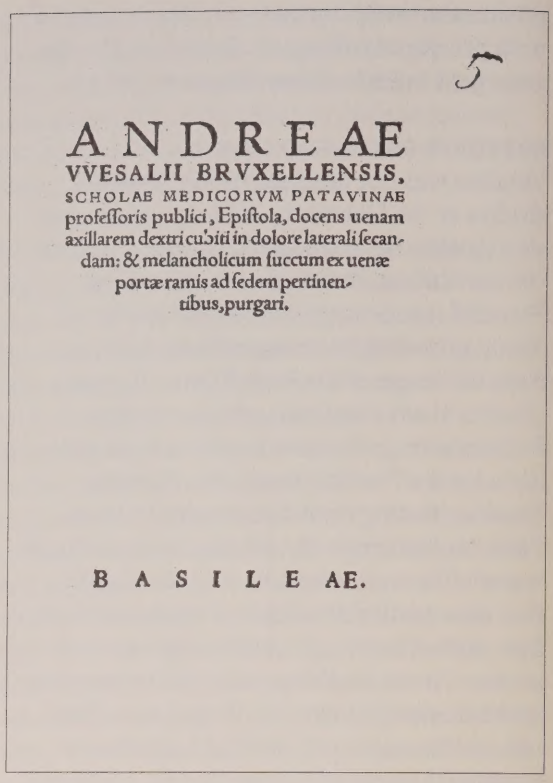
> ... it is just now known to us from the reborn art of dissection, from the careful reading of Galen's books, and from the welcome restoration of many portions thereof that he himself never dissected a human body, but in fact was deceived by his monkeys ... and often wrongly disputed ancient doctors who had trained themselves in human dissections

Paradoxically, however, Vesalius himself had relied on the anatomy of the ape in his depiction of the liver, kidneys, heart, and *rete mirabile* in the *Tabulae anatomicae*.

THE VENESECTION LETTER 1539

Vesalius sent a copy of the *Tabulae anatomicae* to his mentor, Nicolas Flourens, the family friend who had advised the young Vesalius to enroll at the University of Paris in 1533. In his written acknowledgement, Flourens asked Vesalius for his opinion about the proper procedures for venesection. The result was the so-called *Venesection Letter*.

A dispute about the appropriate site of bloodletting in the treatment of pleurisy had been raging for twenty years. Debate revolved around the method of bloodletting to be used. Arab physicians had bled at a point furthest away from the site of infection, whereas the Hippocratic and Galenic practice was to bleed at a point as close as possible to the site. Vesalius agreed with the ancient Greek method, but made certain modifications in cases of pleurisy.


5

ANDREAE
VVESALII BRVXELLENSIS,
SCHOLAE MEDICORVM PATAVINAE
professoris publici, Epistola, docens uenam
axillarem dextri cubiti in dolore laterali secandam: & melancholicum succum ex uenae
portae ramis ad sedem pertinentibus, purgari.

BASILEAE.

The *Venesection Letter* signals further dissociation from traditional and authoritarian anatomy in favour of independent investigation and judgment. For the second time Vesalius expresses disagreement with Galenic teaching. As in the *Tabulae anatomicae,* he is guardedly critical of Galen, by correcting or clarifying what is erroneous or obscure in the Galenic texts. Vesalius meant no disrespect to Galen, whom he refers to as the "Prince of physicians." But he realized that a new exposition of the human body was needed, still based on Galenic principles, but affirmed or repudiated on the evidence of direct observation.

Although Vesalius made his name in the field of anatomy, the *Venesection Letter* demonstrates that he was also interested in problems of clinical medicine. In the opinion of Vesalius the bloodletting controversy could be solved by using a new anatomical basis for the requisite procedures of phlebotomy.

During his investigations, Vesalius had noticed the peculiar shape of certain veins, which he interpreted as thickenings that reinforced the veins. Charles Estienne, too, had seen them and had interpreted them as baffles preventing the rapid flow of blood. In the 1540s Giambattista Canano (1515-1579) and Amatus Lusitanus (1511-1568) correctly identified them as venous valves, but misunderstood their function. The discovery of the valves would lead William Harvey (1578-1657) to a full understanding of their true function in the circulation of the blood in 1628.

BOLOGNA LECTURES 1540

In January 1540 Vesalius received an invitation from medical students of the University of Bologna to present a series of anatomical demonstrations to accompany lectures read by Matteo Corti (1474 or 5-1544). Vesalius had spent a brief period in Bologna in 1538, when he had visited Corti. The two men argued over the question of fibres in the veins, which soured the relationship. During the course of the 1540 lecture series, Corti, a staunch Galenist, read from Mondino's *Anatomia*, confirming or correcting Mondino's text through reference to Galen. Corti believed that dissection was of dubious value, as it merely confirmed what had already been written by Galen. The two men were on a collision course, and the tension was palpable, according to one eyewitness present at the occasion. When Corti interrupted Vesalius, challenging his assertions that contradicted Galen, Vesalius demonstrated that it was Galen who was in error. Perhaps irritated by the patronizing attitude of the older man towards a lowly "dissector," or feeling more audacious and outspoken in his opinions, Vesalius fiercely debated with Corti and subjected him to public humiliation, much to the delight of the student audience.

The Bologna lectures proved to be a testing ground for the teaching techniques that Vesalius was developing. His usual course of action was first to dissect a human, and then a dog, partly to provide a lesson in comparative anatomy, and partly to show where Galen was in error in believing animal anatomy could be applied to humans. At Bologna he performed a complete dissection of an ape and mounted the skeleton alongside that of a human to demonstrate that Galen had based his description of human vertebrae on those of the ape, which were quite different.

The lectures also mark an important stage in Vesalius's intellectual development as an anatomist. He was now at an intermediate stage between the confident adherence to Galenism professed during his first public lecture at Padua in 1537, the hesitant skepticism expressed in *Tabulae anatomicae*, and the confident, sometimes overstated criticism of Galen voiced in the *Fabrica*. With his boldness and self-assuredness growing, Vesalius now turned his thoughts to the great project about which he had hinted in the *Venesection Letter*, and which would ensure his universal fame. At the close of the letter, he reveals that work was already underway:

> I have now almost completed two illustrations of the nerves ... I feel that these must be held back until I have produced illustrations of the muscles and of all the internal parts ... If bodies were available here as they sometimes are elsewhere, not for long would the students lack such a useful work, especially since many distinguished men are constantly urging me to it ... besides others, Marcantonio Genua, our distinguished professor of philosophy ... has strongly urged me to the task ... if bodies become available and Joannes Stephanus, the distinguished contemporary artist, does not refuse his services, I shall certainly undertake that task

GIUNTA EDITION OF GALEN 1541

As he was embarking on his great project, Vesalius was invited to edit the manuscripts of Galen's anatomical treatises for an authoritative Latin edition to be printed by the Giunta Press in Venice in 1541.

The Giuntas had already published editions of Galen in 1522 and 1528. Encouraged by the financial success of these editions, the firm's founder, Luca-Antonio Giunta (1457-1538), masterminded the project to produce a definitive edition of Galen's writings that included the recently recovered texts, as well as improved versions of Latin translations collated against Greek manuscripts. Luca-Antonio did not live to see the finished volumes, which appeared in 1541-1542 in eleven volumes under the editorship of Agostino Gadaldini (1515-1575). A team of scholar-physicians was marshalled to edit and translate individual works. In the introduction Gadaldini mentions several of the contributors by name, including Vesalius, "the celebrated and distinguished contemporary professor of dissection." From Gadaldini we discover that Vesalius was responsible for the editing of *De nervorum dissectione*, Antonius Fortulus's translation of *De venarum arteriarumque dissectione*, and Guenther's Latin version of *De anatomicis administrationibus*.

It is evident from Gadaldini's further remarks that Vesalius was reluctant to revise Guenther's translation of *De anatomicis administrationibus*, for fear of offending his former teacher, perhaps for a second time, so soon after his reworking of Guenther's *Institutiones anatomicae*.

So successful was the Giunta edition of Galen that it was repeatedly reprinted, with as many as nine coming from the press of Giunta, and three from the house of Froben of Basel before 1625.

The three years and four months that elapsed

between the publication of the *Venesection Letter* in April 1539, and the shipment of manuscript and woodblocks of the *Fabrica* across the Alps from Italy to Basel, was a period of intense and remarkable productivity for Vesalius. In that relatively short time he prepared his revision of Guenther's *Institutiones anatomicae*, he contributed to the Giunta edition of Galen, gave a series of lectures in Bologna, wrote a paraphrase of all the books of Rhazes (which he later destroyed), and continued with his teaching and dissecting responsibilities in Padua. At some time during that frenetic period he also managed to conceive, prepare, and compose the *Fabrica*.

DE HUMANI CORPORIS FABRICA, 1543.
The title of Vesalius great work *De humani corporis fabrica* was not original, and may have been suggested to Vesalius by a seventh-century Greek work by Theophilus Protosparatharius, based on Galen's writings, and recently translated into Latin under the same title by Giunio Paolo Grassi at Venice in 1536. It was also the title chosen by Leonhart Fuchs (1501-1566) for the work published by him at Tübingen in 1551, and in two volumes at Lyon in 1551-1555. Felix Platter (1536-1614) entitled his 1583 work on anatomy which copied the illustrations from Vesalius's work *De corporis humani structura et usu*. Adriaan van de Spiegel (1578-1625) also used the title for his anatomical treatise published at Venice in 1627.

In his Dedication to the Emperor Charles V, Vesalius harks back to the Golden Age of Hippocrates, and laments the current state of medicine, in particular the decline in the knowledge and practice of human anatomy. He argues passionately for the revival of the teaching of anatomy in the universities, based on ancient models. Vesalius bitterly complains about the ignorance of the "butcher-barbers" in the techniques of dissection, and urges that the task of dissecting be restored to the professional educated anatomist, who should be the ultimate authority on human anatomy.

The letter of Vesalius to the Basel printer Johannes Oporinus (1507-1568), which accompanied the woodblocks sent from Venice, is included in the prefatory matter. Vesalius goes into considerable detail about the placement of the woodblock illustrations and their accompanying text, and how the indexing of the illustrations by letters should relate to the corresponding anatomical description contained in the main text. Other directions to the printer include the choice of paper, which should be solid and smooth to ensure the best impression from the blocks.

The *Fabrica* is divided into seven books, each of which is subdivided into chapters. Arrangement of the text follows the scheme proposed by Galen in *De anatomicis administrationibus*. Book I treats the bones and cartilage, working downwards from the head to the feet. The final two chapters provide careful instructions for articulating a skeleton. The second Book is devoted to the muscles and ligaments, and attempts to give the fullest possible description of every muscle and its function. Books III and IV deal with the vascular system and the nerves. Book V is devoted to a description of the viscera, and includes a discussion of fetuses and the uterus. In Book VI the heart, lungs, diaphragm, trachea, and gland of the throat are described. The final Book VII studies the brain and demonstrates the successive steps in its dissection.

The humanist classical Latin in which the *Fabrica* is written taxed the abilities of even the most accomplished Latinist. Some of Vesalius's contemporaries, such as Fabricius ab Aquapendente (1537–1619), and Sylvius were critical of his Latin, which was described as unnecessarily prolix, pretentious, pompous, and repetitious. Humanist Latin is characterized by a complex sentence structure of multiple long clauses, rhetorical literary flourishes, and a large wide-ranging vocabulary, all of which, by the standards of the day, were regarded as essential ingredients of elegant Latin. But it is a brand of Latin ill-suited to the lucid expression of scientific discourse, and one that requires considerable concentration on the part of the reader to grasp Vesalius's meaning. The elevated style, however, is occasionally relieved by a more conversational idiom of homely metaphors and anecdotes.

The pictorial initial letters that introduce each book and chapter are of considerable interest, and invest the text with a touch of macabre humour. There are two sets of initials, one large, the other small. All show the anatomist with his naked putti assistants engaged in various acts associated with dissection and surgery, such as the procurement of cadavers, and the preparation of skeletons.

When Vesalius commenced teaching at Padua he still accepted Galen's word as sacrosanct, but the more he worked on cadavers, the more he realized Galen had made mistakes. He spoke out against Galen's doctrines only when he felt that the facts demanded such action, and never went out of his way to disparage Galen or to attempt to undermine his authority. Instead Vesalius chose to take a fresh approach to the study and teaching of

anatomy, by establishing facts based on direct repeated observation and not on tradition. Others before Vesalius had pointed out errors in Galen's texts. Berengario had been one of the first to express in print the need to question textual authority:

> ... in this discipline nothing is to be believed that is acquired either through the spoken voice or through writing; since what is required is seeing and touching ...

In testing Galen's texts, Vesalius corrected or modified as necessary. In the *Fabrica* there are 265 references to Galen, mostly relating to modifications or corrections. But even though he was highly critical about some of Galen's assertions, Vesalius still relied heavily on Galen. In the absence of alternative explanations, Vesalius accepts Galen's version. At other times he deliberately draws attention to Galen's errors by incorporating them into the illustrations.

Vesalius regarded his real enemies as those who blindly accepted Galen's teachings without question, and who would not tolerate any challenge to Galen's authority, or even allow for the possibility that Galen had made mistakes, which might cast doubt on that authority.

EPITOME

An abridged version of the *Fabrica*, entitled *De humani corporis fabrica librorum epitome,* was issued by Oporinus within weeks of the appearance of his larger work in June 1543. The *Epitome* consisted of twelve broadside leaves, and was intended for the use of students who could not afford the large cost of the *Fabrica*. It included most of the illustrations from the *Fabrica*, and added several new ones, including "Adam and Eve" figures and woodcuts showing the progressive dissection of the brain. Another illustration taken from the *Fabrica* is the woodcut displaying the blood vessels and nervous system, accompanied by an additional leaf of individual organs, which the reader is asked to cut out and paste to the master figure.

On 9 August, several days after Vesalius's departure from Switzerland, a German version of the *Epitome* translated by Alban Thorer (1489-1550), physician, professor, and Rector of the University of Basel, was published by Oporinus.

COURT PHYSICIAN

On 4 August 1543, immediately after the publication of the *Fabrica* and the *Epitome*, Vesalius left Basel to seek an audience with the Emperor Charles V, to present him with copies of his new books. The real motive of Vesalius's visit to the Emperor, however, was to seek a position on the imperial medical staff. Vesalius eventually caught up with Charles V in Gelders at the beginning of September, and was appointed physician in ordinary *(medicus familiaris ordinarius)* to the imperial household.

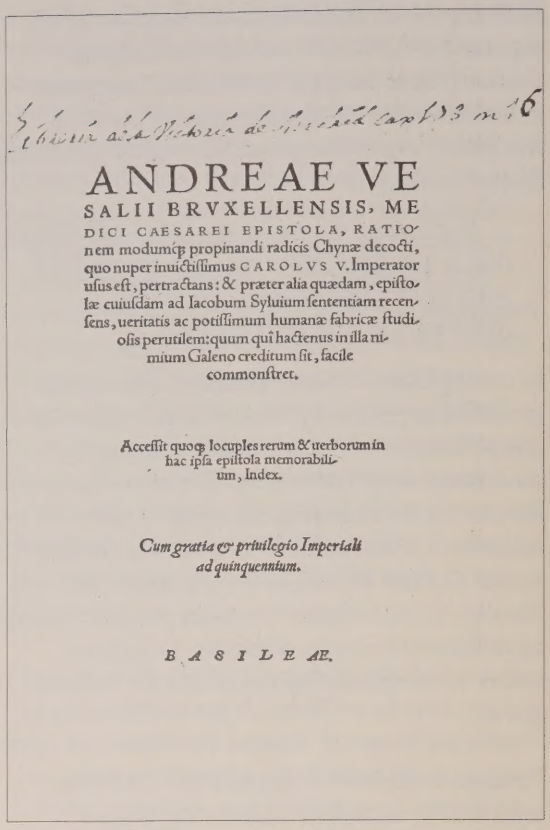
Prior to taking up official duties as physician to the Emperor, during the latter months of 1543 and the early part of 1544 Vesalius visited Padua to settle his affairs, and to perform one final dissection. His next port of call was Bologna, where he was invited by the students to deliver a lecture on the venous system and to perform a dissection. His final destination was Pisa where, on the invitation of Cosimo de' Medici, Duke of Tuscany, he gave an inaugural course of lectures on anatomy at the newly renovated University, and prepared two female skeletons, one of a nun, the other of a young hunchback. He also performed an autopsy. Vesalius's visit to Pisa was such a success, that Duke Cosimo attempted to persuade Vesalius to remain in Pisa by offering him a permanent academic appointment. But having already committed his services to Charles V, Vesalius was obliged to reject the Duke's offer.

The constant military skirmishes between the Holy Roman Empire and its troublesome neighbour France and rebellions within the confines of the Empire required Vesalius to travel around the battlefields in the Emperor's train. In the summer of 1544, outside the besieged town of Saint-Dizier, he examined the viscera of René of Châlon, Prince of Orange (1519-1544), who had been mortally wounded during the siege. Medical duties also included the treatment of soldiers' wounds and amputation, which at that time involved cauterization with boiling oil. These methods were soon to be replaced by the application of antiseptic ointments, thanks to the reforms in field surgery introduced by Ambroise Paré (1517-1590), who, by an irony of history, was on the opposing side within the walls of Saint-Dizier. Eight years later during the siege of Metz, the two surgeons again found themselves on opposite sides. Although Vesalius and Paré were not to encounter each other on this occasion, they did meet again later under different circumstances.

In the winter of 1544 Vesalius's father died, leaving him a large inheritance, including the family house in Brussels. Towards the end of the year Vesalius travelled to Brussels, where he was married to Anne van Hamme. One year later the couple's only child, a daughter Anne, was born.

Much of Vesalius's time during the ensuing years was spent treating an infirm Emperor, whose frequent attacks of gout incapacitated him for weeks on end. The situation was not helped by the Emperor's unbridled gluttony, and his unwillingness to accept his physicians' advice to exercise dietary restraint. The Emperor also suffered from epilepsy, asthma, a persistent cough, an allergy to seafood, and insomnia. A sedentary life without physical exercise exacerbated his generally poor health.

Apart from the occasional dissection that chance brought his way, Vesalius essentially turned his back on anatomical research. A few years later he was regretting his decision, as intrigues and jealousy among the court physicians, caused him to make the impulsive vow to renounce any further medical research. At this low point of his life he claims to have destroyed manuscripts and drafts of several unpublished works, including his annotated copies of Galenic texts, a commentary of the whole text of Rhazes's *Ad Almansorem*, and working notes on a book on *materia medica*. At the same time he was gaining valuable experience as a surgeon, and was consulted on many occasions by various dignitaries both within and outside the Empire. In 1546 he was called to the bedside of the Venetian ambassador, Bernardino Navagero (1507-1565), who had fallen seriously ill at Nijmegen. The ambassador's stubborn illness dragged on, but he was eventually restored to health. That same year Vesalius successfully performed the potentially dangerous surgical procedure of draining the pleural space between the lungs and the chest wall in a case of empyema. In 1548 when examining Maximilian of Egmont, Count of Buren (1509–1548), Vesalius predicted the exact hour of the count's imminent death. When the prophecy was fulfilled with uncanny accuracy, it caused a sensation, which only served to add to Vesalius's reputation. However, not all of Vesalius's medical interventions were successful. There were also botched operations, such as that carried out on the foot of Cristoforo Madruzzo, Cardinal of Trent (1512-1578).



ANDREAE VE
SALII BRVXELLENSIS, ME
DICI CAESAREI EPISTOLA, RATIO-
nem modumq; propinandi radicis Chynæ decocti,
quo nuper inuictissimus CAROLVS V. Imperator
usus est, pertractans: & præter alia quædam, epistolæ cuiusdam ad Iacobum Syluium sententiam recensens, ueritatis ac potissimum humanæ fabricæ studiosis perutilem: quum quî hactenus in illa nimium Galeno creditum sit, facile
commonstret.

Accessit quoq; locuples rerum & uerborum in hac ipsa epistola memorabilium, Index.

Cum gratia & priuilegio Imperiali ad quinquennium.

BASILEAE.

THE CHINA ROOT LETTER AND CONTROVERSIES

The *China Root Letter* was written in response to an enquiry from Joachim Roelants, physician of Metz and an old friend of Vesalius, about the therapeutic use of the root of the *China smilax* plant, recently in vogue as a medication to relieve gout. Vesalius had used it to treat the Emperor's gout, but was unsure about its efficacy.

Only about one-tenth of the letter was devoted to the China root. The rest is taken up with a pugnacious defence of the *Fabrica* against the attacks of the Galenists, who, claimed Vesalius, had stifled the pursuit of scientific enquiry during his student years in Paris. In particular the *China Root Letter* was directed against his old teacher Sylvius, who was at the forefront of the attacks. Sylvius had earlier warned Vesalius, that if he did not retract his lies about Galen, their friendship would be over. When Vesalius refused to back down, the once cordial relationship that existed between the two men deteriorated into open hostility.

Sylvius wrote two further attacks on Vesalius: in 1549 in *Galenus De ossibus ad tyrones versus quidem a Ferdinado Balamio Siculo*, a revised edition of Balamio's translation of Galen's textbook on osteology; and in 1551 in *Vaesani cuiusdam calumniarum in Hippocratis Galenique rem anatomicam depulsio*. Although Sylvius does not mention Vesalius by name, he refers to him as "vaesanus", meaning madman

– an obvious and demeaning pun on his name. His attack on Vesalius had now become personal, bitter, almost hysterical, and ultimately damaging to Sylvius's reputation. When he exhorted the Emperor to intervene and punish "this traitor", even his fellow Galenist colleagues realized he had gone too far, and recognizing that these were the malicious outpourings of an angry old man, began to distance themselves from him. By accepting Galen's anatomy as an article of orthodox faith, Sylvius could not bring himself to contemplate the possibility that Galen might have been in error, and that he may never have performed dissections on human subjects. For if these charges were true, Sylvius's reputation and credibility as a teacher would be brought into question. He was fighting not only for Galen's honour, but also his own. Desperately clutching at straws, Sylvius tried to explain the anatomical discrepancies between Galen's descriptions and those by sixteenth-century anatomists as the result of morphological changes that had occurred in the human body since the second century. Sylvius's death in 1554 spared him the misery of having to confront the second edition of the *Fabrica,* published the following year.

Although Vesalius made no written response to this latest attack, a former student acquaintance from Paris, René Hener [Renatus Henerus] of Lindau, answered on his behalf in *Adversus Jacobi Sylvii depulsionum anatomicorum calumnias pro Andrea Vesalio*, published at Venice in 1555. He described Sylvius's invective as tragic, extremely abusive, and unworthy of its author's years and accomplishments, and attributes his behaviour to envy towards the younger Vesalius.

PLAGIARISMS AND UNAUTHORIZED COPIES

The illustrations of the *Fabrica* were openly copied almost immediately. In his published writings Vesalius makes several references to plagiarism of his work. In its modern connotation, plagiarism is defined as the unlawful act of copying somebody else's work and passing it off, without acknowledgment, as one's own. In Vesalius's day, the term had a broader application to refer to any unauthorized copying, even if the original author is named. In anticipation of the illustrations of the *Fabrica* being copied, Vesalius had taken the precaution of securing licenses to protect his intellectual property in the territories of the Republic of Venice, the Papal States, and the Holy Roman Empire. But in sixteenth-century Europe, where legal copyright did not exist, outside these areas Vesalius was powerless to stop the pirates.

THOMAS GEMINUS

The first person to copy the illustrations of the *Fabrica* without Vesalius's permission was Thomas Geminus (d. 1562), whose *Compendiosa totius anatomie delineatio* first appeared in 1545. An English edition was issued in 1553 with a completely different text, followed by a second English edition in 1559.

Despite Vesalius's bitter complaints about the poor quality of the reproductions, which, he claimed, misrepresented him, and did him a disservice, it is unlikely that he ever actually saw a copy of the *Compendiosa*. To reproduce the Vesalian woodcut illustrations Geminus resorted to engravings, which were accomplished with great skill. Indeed, Geminus's illustrations may be interpreted as a tribute to Vesalius's anonymous artist, who, ironically, was not acknowledged by Vesalius in the *Fabrica*. Geminus's fine engravings contrast starkly with the text printed in an inelegant black letter, that is punctuated with many typographical errors and misreadings.

As with most imitators of the *Fabrica*, Geminus failed to grasp the significance of the close relationship between text and illustration that Vesalius had striven to achieve. Nevertheless, his *Compendiosa* contributed to the spread of Vesalius's renown, particularly in England. But as an anatomical treatise, without the Vesalian text, it was of questionable value, though it probably had its use in assisting barber-surgeons to acquire some basic knowledge of anatomy and dissection skills.

Geminus's original copper plates were subsequently taken to France by the poet and doctor Jacques Grevin (circa 1539-1570). Through his efforts, a Latin edition was published in Paris by André Wechel in 1564, entitled *Anatomes totius, aere insculpta delineatio, cui addita est epitome innumeris mendis repurgata ... per Iacobum Grevinum*. Although Vesalius's name appears quite prominently on the title page, there is no mention of Geminus. Another Latin version appeared in 1565, and a French translation was issued in 1569 entitled *Les portraicts anatomiques de toutes les parties du corps humain*.

A different kind of plagiarism is manifest in the two-volume edition of the *Fabrica* produced in Lyon in 1552 by Jean de Tournes. It is unusual in that it plagiarises only the text of the *Fabrica*, and omits the illustrations, apart from four small woodcuts of the cranium.

In February 1553, on the eve of Epiphany, Emperor Charles V announced his intention to

abdicate in stages over the next five years. The Spanish crown was inherited by his son Philip II of Spain, and the crown of the Holy Roman Empire was handed over to his brother Ferdinand I. Charles eventually retreated to the Hieronymite convent of Juste in the Spanish Extremadura. As a reward for his faithful service, Vesalius was granted a life pension, and was created a Count Palatine, but he had lost a courteous and generous master. In June 1556 he was named as a physician to the household of King Philip II.

DE HUMANI CORPORIS FABRICA. 1555.
In 1546 during a prolonged stay in Ulm, while the Emperor recovered from his latest attack of gout, Vesalius had made a visit to Basel, possibly to discuss publication of a second edition of the *Fabrica* with Oporinus. Between the end of August 1550 and October 1551, during another long sojourn, this time in Augsburg, Vesalius began making preparations for the new edition. The entire text was reset in larger type, and a new woodcut title page was supplied. Most of the woodcut illustrations used in the 1543 edition, except for the title page, were reused in the new edition. Textually, there were several substantive changes, such as additions made in the light of new findings, deletions, and a large number of stylistic changes made in an effort to produce a more elegant Latin.

At the same time as the second edition of the *Fabrica* was published, a new edition of the *Epitome*, with the final leaf reset, also appeared.

VESALIUS THE PHYSICIAN
Between 1553 and 1556 Vesalius spent considerable time with his family in Brussels, where he established a lucrative private practice as a consultant physician, and acquired a reputation throughout Europe, though not everyone was convinced of Vesalius's abilities as a physician. Cardinal Granville remarked sarcastically that Vesalius always declared his patients' maladies to be mortal, so that in the event of death, he would be exonerated from any blame, but if the patient were to live, he would be said to have brought about a miraculous cure.

In 1558 he was called on to attend Anna van Egmont, Princess of Orange (1533-1558), who died despite Vesalius's ministrations. The following year he was called urgently to Paris to the court of King Henry II who had been mortally wounded when a piece of his opponent's broken lance lodged in his eye socket during a tournament. The King subsequently died from complications from his injuries. The post-mortem examination was conducted by Vesalius. A woodcut of the King's death by Jacques Tortorel, after the design of Jean Perrissin, shows Vesalius in consultation with the court surgeon Ambroise Paré at the king's bedside.

On his return to Brussels in mid-July 1559, Vesalius made preparations to move with his family to Spain with Philip's retinue. Bad weather delayed departure, and finally on 23 August Vesalius left Brussels with his family. His official title was not *protomedicus* to Philip II, as he would probably have wished, but the lesser post of "physician to the Netherlanders at the court of Madrid." In Spain medicine had not quite reached the standards of the rest of Europe, and Vesalius later complained about the stultifying atmosphere of medicine there. Nevertheless, his services were sought after by a number of foreign embassies in Madrid.

In the spring of 1562, while convalescing from a long illness in Alcalá, the seventeen-year old Don Carlos (1545–1568), Philip II's eldest son, and heir to the Spanish throne, while pursuing a young woman, fell down a set of stone steps and caused serious injuries to his head. The wound festered and developed into an abscess that covered his entire face, neck, chest, and upper arms. The physicians in attendance treated the heir with cupping and applied various restoratives, but to no avail, as Don Carlos's condition deteriorated. On the eleventh day the king was sent for, and with Vesalius made the thirty-five kilometre journey from Madrid to Alcalá. As a last resort, the century-old relics of the Blessed Fray Diego, a Franciscan friar, were brought from a nearby monastery and placed alongside Don Carlos. Meanwhile Philip retreated to a monastery to pray for his son. The following morning there had been a remarkable improvement in Don Carlos's condition, which was attributed to the miraculous relics of Fray Diego, while the physicians believed the credit for healing should have gone to them.

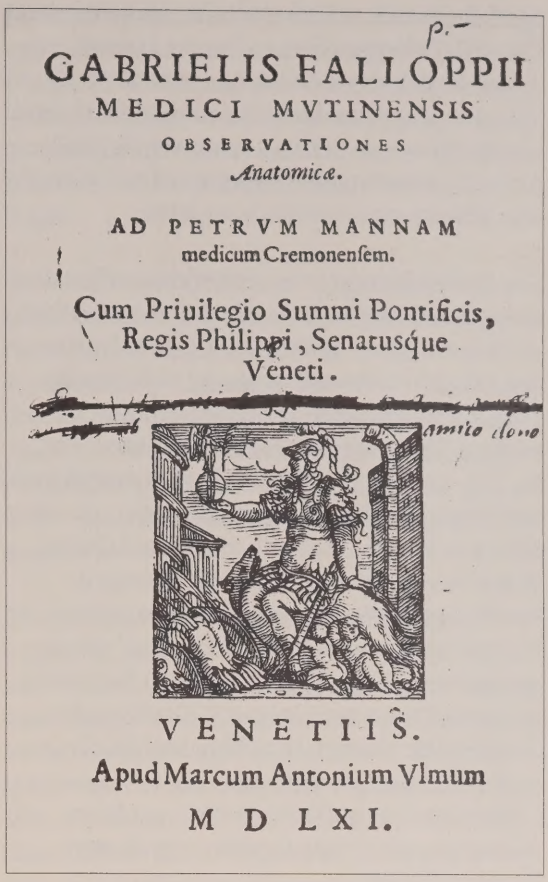
In 1562 Giovanni d'Arragona, marquis de Terranova, was wounded in the chest during a tournament, and developed a traumatic lung empyema. Vesalius, who had enjoyed some recent successes in the treatment of the condition, was consulted by the Palermo physician and anatomist Giovanni Filippo Ingrassia (1510-1580). Ingrassia followed Vesalius's instructions for draining the thoracic space, and the marquis eventually made a full recovery. The grateful and much relieved Ingrassia wrote up and published Vesalius's "consilia".
Between October 1563 and January 1564, when the Spanish court was in Monzón, the English

ambassador, Sir Thomas Chaloner (1521-1565) was successfully treated by Vesalius for kidney stones with a concoction of liquorice and barley.

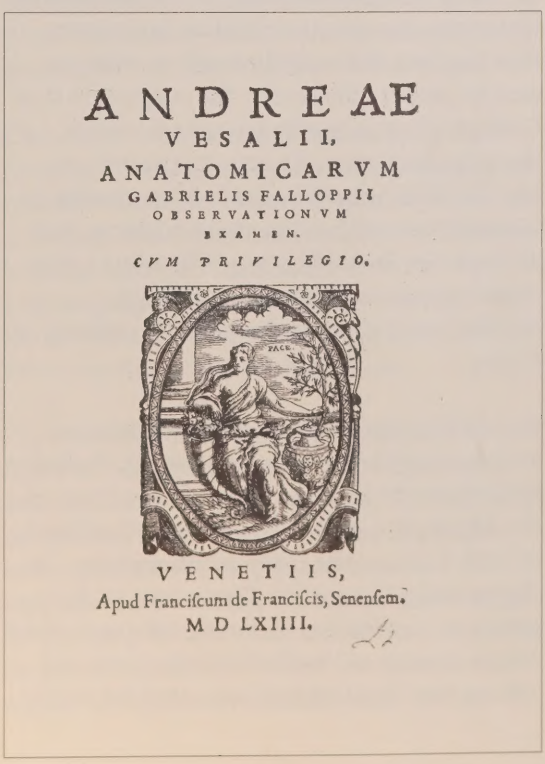
RECEPTION OF THE FABRICA: SUPPORTERS AND DETRACTORS

Following the successful publication of the second edition of the *Fabrica*, and the death of Sylvius, Vesalius may have anticipated a period of respite from the controversies that his anatomical writings had provoked. It must have come as something of an unpleasant surprise, when in 1562, nineteen years after the publication of the *Fabrica*, there appeared a book entitled *Apologia in anatome pro Galeno contra Andream Vessalium [sic] Bruxellensem*, by one Francesco dal Pozzo [Franciscus Puteus], a practicing physician from Vercelli, who had attended Vesalius's lecture at Bologna in 1544. This outrageously hostile tirade against Vesalius repeated most of the accusations made by Sylvius – that Vesalius had falsified Galen's words, while deliberately ignoring some of Galen's assertions. The worst of Vesalius's crimes was his assertion that Galen had never dissected a human cadaver. Few would have paid much attention to this latest attempt to defame Vesalius, had Pozzo not rashly named the anatomists who he claimed were opposed to Vesalius. One of those named was Gabriel Cuneus, professor of anatomy at the University of Pavia, who indignantly sprang to Vesalius's defence in his *Apologiae Francisci Putei pro Galeno in anatome examen*, published at Venice in 1564, in which he accused Pozzo of mendacity and professional jealousy. It was erroneously thought by many, including Girolamo Cardano and the editors of the 1725 Leiden edition of Vesalius's *Opera omnia*, Boerhaave and Albinus, that Cuneus was a pseudonym of Vesalius himself.

One of Vesalius's greatest admirers was Gabriel Falloppio (1523?-1562), whose only book published during his lifetime was *Observationes anatomicae* in 1561. Falloppio pointed out that Vesalius had failed to observe a third ossicle of the ear, first discovered by Giovanni Filippo Ingrassia. Vesalius had claimed the sacrum consisted of six pieces, whereas the normal number was five. Falloppio contested Vesalius's belief that the veins contained three kinds of fibres that controlled the flow of blood. Vesalius accepted these corrections, as well as Falloppio's account of dentition, which he admitted was far superior to his own. He also accepted, though only conditionally until he was able to verify it for himself, Falloppio's account of the *levator palpebrae*, the muscle responsible for raising the eyelid, which Falloppio had discovered. Among Falloppio's other discoveries were the uterine tubes shaped like trumpets, which were named after him.


GABRIELIS FALLOPPII
MEDICI MVTINENSIS
OBSERVATIONES
Anatomicæ.
AD PETRVM MANNAM
medicum Cremonenſem.
Cum Priuilegio Summi Pontificis,
Regis Philippi, Senatuſque
Veneti.
VENETIIS.
Apud Marcum Antonium Vlmum
M D L X I.

Vesalius was probably glad to receive Falloppio's calm, rational, and scientifically irreproachable critique to his *Fabrica*, after years of fighting implacable and emotional Galenist apologists. He took no offence at Falloppio, and in fact commended him as a seeker of truth. The only sign of irritation came in Vesalius's


ANDREAE
VESALII,
ANATOMICARVM
GABRIELIS FALLOPPII
OBSERVATIONVM
EXAMEN.
CVM PRIVILEGIO.
VENETIIS,
Apud Franciſcum de Franciſcis, Senenſem.
M D LXIIII.

published reply to Falloppio, his *Anatomicarum Gabrielis Falloppii Observationum examen,* in which he delivers a damning assessment of Valverde for whom he had a strong dislike, and whom Falloppio, perhaps imprudently, had praised. Unfortunately Falloppio died before he was able to read Vesalius's response.

Another anatomist who was critical of Vesalius was Matteo Realdo Colombo (circa 1516-1559). A former student of Vesalius's, Colombo succeeded him as chair of anatomy at Padua in 1543. Although Vesalius has been much maligned for criticizing Galen, Colombo was the first to point out Vesalius's own mistakes in applying animal anatomy to humans – the very fallacy of which Vesalius had accused Galen. When he returned to Padua, an outraged Vesalius publicly ridiculed Colombo, calling him an "ignoramus" and stating that "what meagre knowledge [Colombo] has of anatomy he learned from me." In 1545 Colombo transferred to the University of Pisa, and finally in 1548 to the *Collegia della Sapienza* in Rome. Colombo's only published work was *De re anatomica*, which appeared in 1559 shortly before his death.

Another of Vesalius's critics was Bartolomeo Eustachi (d. 1574), papal physician and Colombo's successor at the *Collegia della Sapienza*. In his *Opuscula anatomica,* published at Venice in 1563, Eustachi chastised Vesalius for the severity of his attack on Galen, suggesting that he was motivated by a desire to draw attention to himself through controversy. Galen, claimed Eustachi, had been misquoted, taken out of context, and deliberately misinterpreted by Vesalius, who also ascribed to Galen words he did not write. Eustachi concedes that Galen may have made mistakes, but asserts that he never did so deliberately in order to deceive, and is offended by the suggestion that Galen had intentionally passed off animal anatomy as human. He goes on to point out that Vesalius himself had relied on animals in his treatment of the eyes, tongue, larynx, and kidneys. For Eustachi many of Vesalius's criticisms were trivial, and served to mask Vesalius's ambitious nature and his jealousy of Galen.

Not all Galenists were opposed to Vesalius. Hieronymus Gemusaeus (1505-1544), Professor of Medicine at Basel, and one of the editors of the Greek edition of Galen published at Basel in 1538, declared the *Fabrica* a masterpiece. In the second edition of his *Commentarius de anima* of 1545 Philipp Melanchthon (1497-1560) adopted many of Vesalius's conclusions, and affirms that Vesalius had been working within the Galenic tradition, performing in practice the methodology that Galen had only been able to suggest in theory.

FINAL YEARS AND DEATH

Early in 1564 Vesalius petitioned Philip for permission to be absent from court in order to make a pilgrimage to Jerusalem. The reason for the pilgrimage is not known for sure, but numerous rumours have circulated since 1564. According to a letter written by the French diplomat and religious reformer Hubert Languet (1515-1581) to the Wittenberg professor of mathematics and medicine Caspar Peucer (1525-1602), Vesalius had been performing an autopsy on a Spanish grandee, who was presumed dead. Upon opening the chest, Vesalius saw that the subject's heart was still beating. Vesalius was reported to the Inquisition who found him guilty of vivisection and sentenced him to death. On the king's intercession the death sentence was overturned on condition that Vesalius make a trip to Jerusalem and Mount Sinai to expiate the crime. There is no evidence to support this story, nor a similar account by Ambroise Paré, which substitutes a woman for the grandee. The story is probably apocryphal, though quite feasible, as human vivisection was considered to be a most serious crime.

According to another account, Vesalius decided to leave Spain because of the hostile treatment he had received at the hands of the Spanish medical fraternity – a repetition of the kind of reception he had been given in Brussels and elsewhere while serving the Emperor Charles V. His lack of popularity, coupled with the fact that revolt was brewing in the Netherlands against Spanish rule, resulting in Flemings being regarded with suspicion and hostility, persuaded him to leave Spain. Yet another account, by the Flemish botanist Charles de l'Écluse (1526-1609), relates that Vesalius had been suffering from a long illness, which had been followed by a slow and difficult period of recovery. His pilgrimage was made as a penitent Christian giving thanks for his delivery from death. While the reasons for Vesalius's departure remain obscure, his death during his return journey from the Holy Land is shrouded in even greater mystery.

Vesalius set off for Palestine with a letter from Philip requesting unimpeded passage across borders. On the initial part of the journey he was accompanied by his wife and daughter, but in France, possibly after an explosive quarrel, they parted company. While the wife and daughter went on to Brussels, Vesalius made for Marseilles where he took a boat to Venice. It

is quite possible that while he was in Venice he made the short trip to Padua, for by this time Falloppio had died, leaving the chair of anatomy at Padua vacant. Vesalius may have contemplated applying for the post, as he had earlier shown indications that he would have welcomed a return to academic life. According to one Pietro Bizzari, Vesalius received an offer from the Venetian Senate to take up the post on his return from his pilgrimage.

Vesalius eventually reached Jerusalem safely, but the return journey was catastrophic. During a stormy passage during which supplies on board ran low, Vesalius fell ill, and was put off the ship onto the Ionian island of Zante (present day Zakynthos) where within a short time he passed away. The precise place of his death is unknown, but it is believed that he was buried in the churchyard of Santa Maria delle Grazie in the main town of Zante. The church and its graveyard were destroyed in an earthquake in 1893, but a project to locate the remains of Vesalius is currently underway. Some accounts blame his premature death on his parsimony, for had he travelled on a vessel of the Venetian fleet and not on a cheap and disreputable pilgrim ship, he might have survived the voyage.

CONCLUSION

Despite the wealth of material written about Vesalius the anatomist, we still know very little about Vesalius the man. It is, therefore, very difficult to make any kind of accurate assessment of the kind of person he was. Evidence would strongly suggest, however, that he was not a particularly likeable person. He had many faults, some of which were embedded in his complex personality, and for which he cannot be held fully responsible. Like many other intellectuals of his age he was ambitious and self-serving, quick to anger, and completely unforgiving to those who had opposed or offended him. The inability to forgive and forget caused him much criticism in his own lifetime and still taints his reputation. For a man who expressed himself so passionately about plagiarism, Vesalius himself appropriated the work of others without acknowledgment. It should also be pointed out that it was not Vesalius's writings that were plagiarized, but the majestic illustrations that informed his texts. Yet nowhere, except in the *Tabulae anatomicae*, does he acknowledge his artists and blockcutters, even anonymously.

We know a little about the many acquaintances he encountered during his life, mostly persons from the upper echelons of society as well as professional colleagues. But his difficult personality made him few close friends, and his aggressive manner alienated many colleagues. His lonely death on a remote island far from home, his burial in an unmarked grave, with no grand funeral at home to celebrate his achievements, make his personal life all the more tragic.

Yet Vesalius should not be judged on his personal shortcomings, most of which are conjectural, but on his achievements as an extraordinary anatomist. His vanity and driving ambition, seen by many as faults, provided the motivation and single-mindedness required to produce the *Fabrica*, and to lay out a new path for the study and teaching of anatomy.

The special chapters of the *Fabrica* that explained the method of dissection were an innovation. Vesalius insisted that the anatomist take charge by undertaking his own dissections without the assistance of a barber. He consistently stressed the necessity of a purely scientific approach to anatomy, based on repeated direct observation. There was nothing new in this, as it had been professed on many occasions by Galen, and later by others. But Vesalius demonstrated this belief through personal example. He not only raised the standard of anatomical dissection to new heights, he also redefined the status of the anatomist, by elevating him from his hitherto lowly station to that of the physician. He helped make anatomy respectable.

Vesalius transformed the teaching of anatomy in a number of significant ways. Wherever he lectured, he always had a skeleton at hand for the fundamental study of the bones, and to demonstrate and reinforce in the memory the location of various structures in the body.

Like other medical men of the early sixteenth century, Vesalius made a major contribution to the reform and development of anatomical terminology, which had been in a state of disarray. Vesalius often provided medical terms in several languages for ease of comprehension, but his preference was a return to the Latin, or Latinized version of the original Greek.

His most important pedagogical innovation, however, was the introduction of illustration into the classroom, and, more significantly, into the printed book. Vesalius realized the enormous potential of the printed book as a medium for the spread of scientific knowledge. At the same time he understood the role played by good illustrations. Where words were inadequate to express a particular idea, an illustra-

tion could demonstrate the point much more eloquently and directly. The close association of image and text was relatively new, with Leonhart Fuchs's *De historia stirpium*, published by Isingrin the year before the *Fabrica*, being an obvious precursor. In the *Fabrica* Vesalius takes the use of illustration one step further: by employing an outstanding artist and block-cutter to create anatomically accurate images, he is responsible for bringing art into medicine.

Others had questioned the validity of some of Galen's statements before Vesalius, if only timidly. Vesalius's approach was more aggressive, even arrogant, but never disrespectful, despite what his critics claimed. Indeed, Vesalius relied on Galen for much of the composition of the *Fabrica*, and unwittingly repeated many of Galen's erroneous assertions. His real achievement was to force others to re-examine Galen, and to affirm or repudiate his statements on the evidence of personal direct observation. Wherever Galen was in error, it was the responsibility of the anatomist to make the requisite corrections.

Vesalius made no major anatomical discoveries, and the *Fabrica* was not without errors of its own, as Vesalius's critics were quick to point out. But its merits far outweigh its deficiencies, and most importantly, it laid the foundation for a new exposition of the human body that others could build on, improve and refine.

THE EXHIBITION

1 Girolamo Cardano. "De exemplis centum geniturarum: XCIII" in *Opera omnia*. Lyon: J.A. Huguetan & M.A. Ravaud, 1563. Vol. 5.

Vesalius's horoscope was cast in 1547 by the mathematician, astrologer, and physician, Girolamo Cardano (1501-1576), and was first published at Nuremberg in his *Libri quinque*. Cardano foresaw a great future for Vesalius:

> Most admirable expert in dissecting cadavers, comparable in merit to the ancients, he wrote a work which whilst his first yet is so excellent as to solve all difficulties; celebrated in life, now already Imperial physician, he is bound to be celebrated after his death. If this is his birth-date, everything in it is up to the measure, for Mars is the square of the mighty Moon in its eighth exhibits zeal and skill of hands. Mercury in the triple of Jupiter and Venus in the square exhibit an admirable mind and an eloquence not only up to the mark, but even above it – he is, indeed, an eminent physician. The Moon in opposition to the Sun gives memory and knowledge, and many enemies, indicating an illustrious person, seeing the birth-date is a nocturnal one. Saturn with the heart of Scorpio, in the sixth of Mercury, indicates a profound mind, memory, and zeal. *Spica Virginis* in the heart of the sky indicates a glory due to skill as great as anyone's. One must consider also Mars facing the Sun in his exaltation while the Moon is her domicile – denoting favour with princes. The only thing missing, according to our decisions, is that no planet dominates the horoscope.

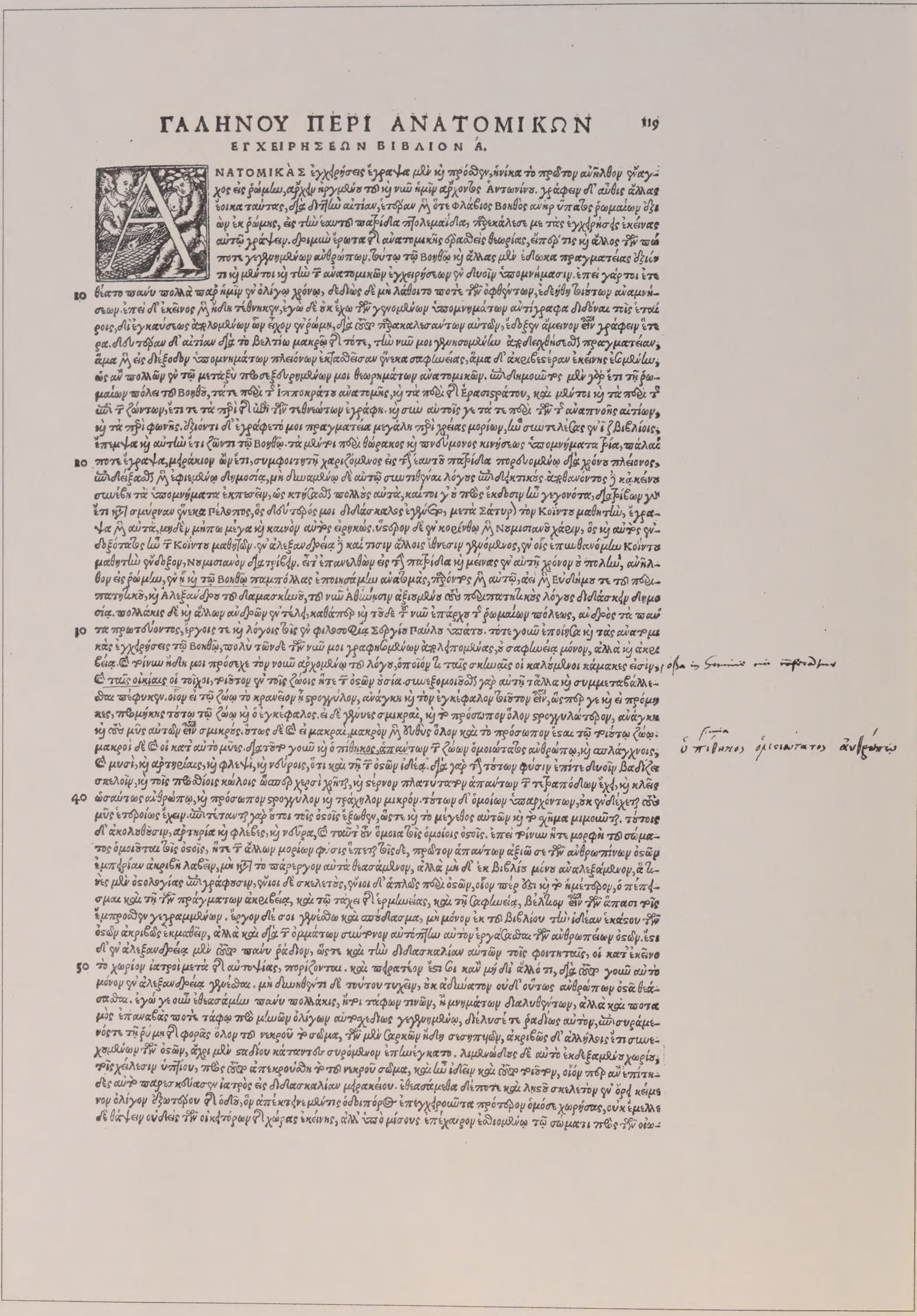
However, the astrological prognostication was written with the benefit of hindsight, after Vesalius had already become famous.

2 Gregor Reisch, (d. 1525). *Margarita philosophica, cũ additionibus nouis, ab auctore suo studiosissima reuisiõe tertio supadditis*. Basel: Johann Schott, 1508.

After receiving his master's degree in 1489 from the University of Freiburg, Gregor Reisch entered the Carthusian Order. As an author and pedagogue he is principally remembered for his *Margarita philosophica*, an encyclopaedic work, illustrated with numerous woodcuts, covering all branches of knowledge. The book was intended for young students preparing for university, and was extremely popular. First published in 1503, it was re-issued many times. Each of its twelve books treats a separate subject: Latin grammar, dialectics, rhetoric, arithmetic, music, geometry, astronomy, physics, natural history, physiology, psychology, and ethics. The *Margarita philosophica* was one of the books recalled by Vesalius from his school years in Leuven. In particular he specifically remembered the image of the human head, indicating the sites and central connections of the sense organs. This image was copied many times for over a century.

Another striking image from the book is the schematic male figure showing the division of the body into the three cavities or venters.

(see above p. 11)



ΓΑΛΗΝΟΥ ΠΕΡΙ ΑΝΑΤΟΜΙΚΩΝ 119

ΕΓΧΕΙΡΗΣΕΩΝ ΒΙΒΛΙΟΝ Α.

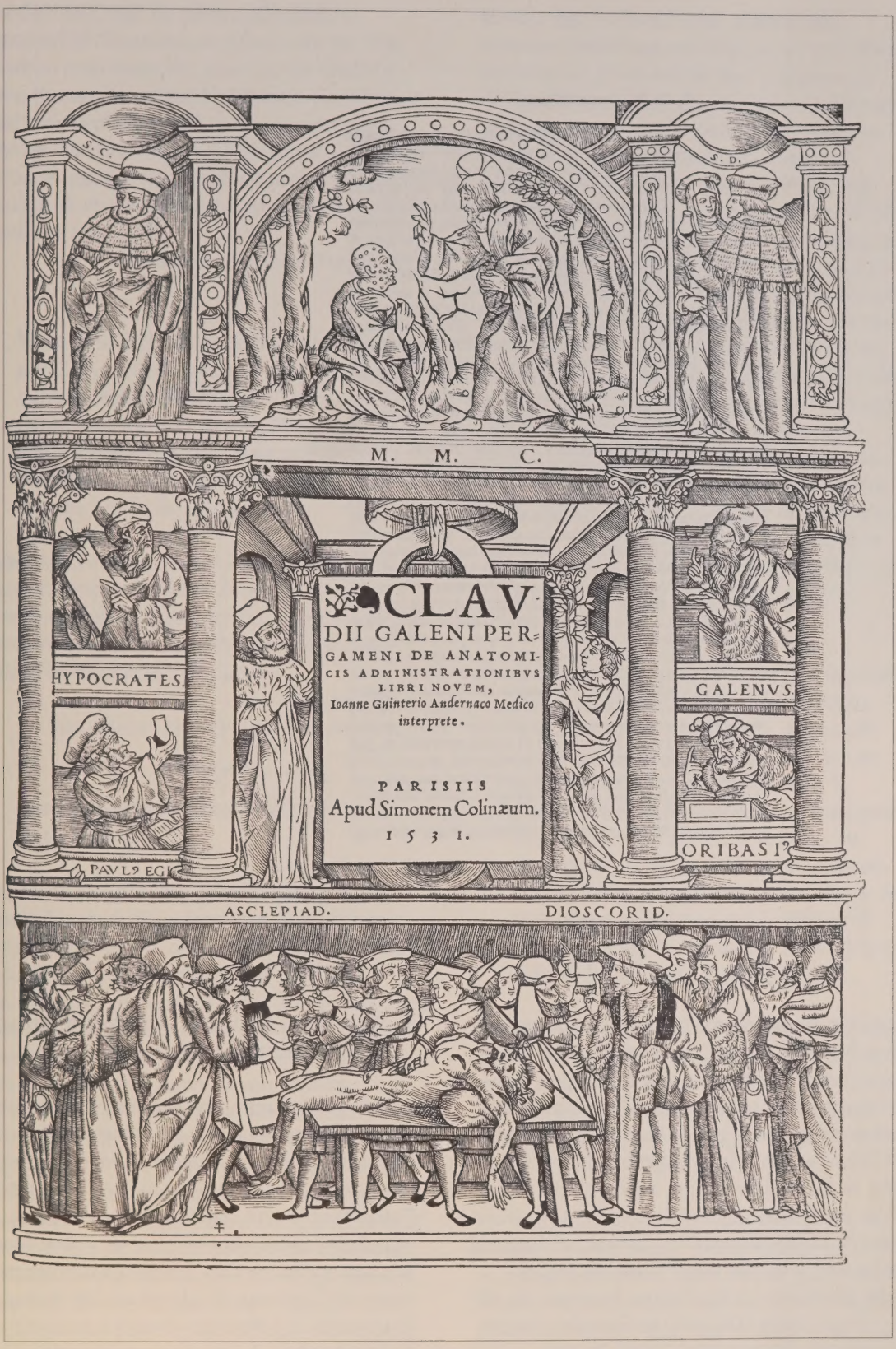
ΑΝΑΤΟΜΙΚΑΣ ἐγχειρήσεις ἔγραψα μὲν καὶ πρόσθεν, ἡνίκα τὸ πρῶτον ἀνῆλθον ἐν ἀρχῇ εἰς ῥώμην, ἀρχὴν ἠργμένου τοῦ καὶ νῦν ἡμῖν ἄρχοντος Ἀντωνίνου. γράφειν δ' αὖθις ἄλλας ἔοικα ταύτας, διὰ διττὴν αἰτίαν, ἑτέραν μὲν ὅτε Φλάβιος Βοηθὸς ἀνὴρ ὕπατος ῥωμαίων ἐξιὼν ἐκ ῥώμης, εἰς τὴν ἑαυτοῦ πατρίδα Πτολεμαΐδα, προὐκαλέσατό με τὰς ἐγχειρήσεις ἐκείνας αὐτῷ γράψειν. δριμὺν ἔρωτα τῆς ἀνατομικῆς ἐρασθεὶς θεωρίας, εἴπερ τις καὶ ἄλλος τῶν πώποτε γεγενημένων ἀνθρώπων. τούτῳ τῷ Βοηθῷ καὶ ἄλλας μὲν ἔδωκα πραγματείας ἐξιόντι καὶ μέντοι καὶ τὴν τῶν ἀνατομικῶν ἐγχειρήσεων ἐν δυοῖν ὑπομνήμασιν. ἐπεὶ γάρτοι ἐτεθέατο πάνυ πολλὰ παρ' ἡμῖν ἐν ὀλίγῳ χρόνῳ, δεδιὼς δὲ μὴ λάθοιτο ποτὲ τῶν ὀφθέντων, ἐδεήθη τούτων ἀναμνήσεων. ἐπεὶ δ' ἐκεῖνος μὲν ἤδη τέθνηκεν, ἐγὼ δὲ οὐκ ἔχω τῶν γενομένων ὑπομνημάτων ἀντίγραφα διδόναι τοῖς ἑταίροις, διὰ τὴν ἐγκαύσεως ἀπολομένων ὧν εἶχον ἐν ῥώμῃ, διὰ τοῦτο παρακαλεσάντων αὐτῶν, ἔδοξεν ἄμεινον εἶναι γράφειν ἕτερα. δευτέραν δ' αἰτίαν διὰ τὸ βελτίω μακρῷ τῶν τότε, τὴν νῦν μοι γενησομένην ἀποδειχθήσεσθαι πραγματείαν, ἅμα μὲν εἰς διέξοδον ὑπομνημάτων πλειόνων ἐκταθεῖσαν ἕνεκα σαφηνείας, ἅμα δ' ἀκριβεστέραν ἐκείνης ἐσομένην, ὡς ἂν πολλῶν ἐν τῷ μεταξὺ προσεξευρημένων μοι θεωρημάτων ἀνατομικῶν. ἐπιδημοῦντος μὲν γὰρ ἔτι τῇ ῥωμαίων πόλει τοῦ Βοηθοῦ, τά τε περὶ τῆς Ἱπποκράτους ἀνατομῆς, καὶ τὰ περὶ τῆς Ἐρασιστράτου, καὶ μέντοι καὶ τὰ περὶ τῆς ἐπὶ τῶν ζώντων, ἔτι τε τὰ περὶ τῆς ἐπὶ τῶν τεθνεώτων ἔγραψα. καὶ σὺν αὐτοῖς γε τά τε περὶ τῶν τῆς ἀναπνοῆς αἰτίων, καὶ τὰ περὶ φωνῆς. ἐξιόντι δ' ἐγράφετό μοι πραγματεία μεγάλη περὶ χρείας μορίων, ἣν συνετέλεσα ἐν ιζ βιβλίοις, ἔπεμψα καὶ αὐτὴν ἔτι ζῶντι τῷ Βοηθῷ. τὰ μέντοι περὶ θώρακος καὶ πνεύμονος κινήσεως ὑπομνήματα τρία, πάλαι ποτὲ ἔγραψα, μειράκιον ὢν ἔτι, συμφοιτητῇ χαριζόμενος εἰς τὴν ἑαυτοῦ πατρίδα πορευομένῳ διὰ χρόνου πλείονος, ἐπιδείξασθαι μὲν ἐφιεμένῳ δημοσίᾳ, μὴ δυναμένῳ δὲ αὐτῷ συνθεῖναι λόγους ἐπιδεικτικούς. ἀποθανόντος δὲ κἀκείνου συνέβη τὰ ὑπομνήματα ἐκπεσεῖν, ὡς κτήσασθαι πολλοὺς αὐτά, καίτοι γ' οὐ πρὸς ἔκδοσιν ἦν γεγονότα, διατρίβων γὰρ ἔτι κατὰ σμύρναν ἕνεκα Πέλοπος, ὃς δεύτερός μοι διδάσκαλος ἐγένετο, μετὰ Σάτυρον τὸν Κοΐντου μαθητήν, ἔγραψα μὲν αὐτά, μηδὲν μήπω μέγα καὶ καινὸν αὐτὸς εὑρηκώς. ὕστερον δὲ ἐν Κορίνθῳ μὲν Νουμισιανοῦ χάριν, ὃς καὶ αὐτὸς ἐνδοξότατος ἦν τῶν Κοΐντου μαθητῶν. ἐν Ἀλεξανδρείᾳ δὲ καί τισιν ἄλλοις ἔθνεσιν γενόμενος, ἐν οἷς ἐπυνθανόμην Κοΐντου μαθητὴν ἔνδοξον, Νουμισιανὸν διατρίβειν. εἶτ' ἐπανελθὼν εἰς τὴν πατρίδα καὶ μείνας ἐν αὐτῇ χρόνον οὐ πολύν, ἀνῆλθον εἰς ῥώμην, ἐν ᾗ καὶ τῷ Βοηθῷ παμπόλλας ἐποιησάμην ἀνατομάς, παρόντος μὲν αὐτῷ, ἀεὶ μὲν Εὐδήμου τε τοῦ περιπατητικοῦ, καὶ Ἀλεξάνδρου τοῦ Δαμασκηνοῦ, τοῦ νῦν Ἀθήνησιν ἀξιουμένου τοὺς περιπατητικοὺς λόγους διδάσκειν δημοσίᾳ. πολλάκις δὲ καὶ ἄλλων ἀνδρῶν ἐν τέλει, καθάπερ καὶ τοῦδε τοῦ νῦν ἐπάρχου τῆς ῥωμαίων πόλεως, ἀνδρὸς τὰ πάντα πρωτεύοντος, ἔργοις τε καὶ λόγοις τοῖς ἐν φιλοσοφίᾳ Σεργίου Παύλου ὑπάτου. τότε γοῦν ἐποιησάμην καὶ τὰς ἀνατομικὰς ἐγχειρήσεις τῷ Βοηθῷ, πολὺ τῶνδε τῶν νῦν μοι γραφησομένων ἀπολειπομένας, οὐ σαφηνείᾳ μόνον, ἀλλὰ καὶ ἀκριβείᾳ. ὥσπερ οὖν ἤδη μοι πρόσεχε τὸν νοῦν ἀρχομένῳ τοῦ λόγου, ὁποῖόν τι ταῖς σκηναῖς οἱ καλούμενοι χάρακές εἰσιν, καὶ ταῖς οἰκίαις οἱ τοῖχοι, τοιοῦτον ἐν τοῖς ζῴοις ἡ τῶν ὀστῶν οὐσία. συνεξομοιοῦσθαι γὰρ αὐτῇ τἆλλα καὶ συμμεταβάλλεσθαι πέφυκεν. οἷον εἰ τῷ ζῴῳ τὸ κρανίον ἦ στρογγύλον, ἀνάγκη καὶ τὸν ἐγκέφαλον τοιοῦτον εἶναι, ὥσπερ γε καὶ εἰ προμήκες, προμήκης τούτῳ τῷ ζῴῳ καὶ ὁ ἐγκέφαλος. εἰ δὲ γένυες σμικραί, καὶ τὸ πρόσωπον ὅλον στρογγυλώτερον, ἀνάγκη καὶ τοὺς μῦς αὐτῶν εἶναι σμικρούς. οὕτως δὲ καὶ εἰ μακραί, μακρὸν μὲν εὐθὺς ὅλον καὶ τὸ πρόσωπον ἔσται τῷ τοιούτῳ ζῴῳ. μακροὶ δὲ καὶ οἱ κατ' αὐτὸ μύες. διὰ τοῦτο γοῦν καὶ ὁ πίθηκος, ἁπάντων τῶν ζῴων ὁμοιότατος ἀνθρώπῳ, καὶ σπλάγχνοις, καὶ μυσί, καὶ ἀρτηρίαις, καὶ φλεψί, καὶ νεύροις, ὅτι καὶ τῇ τῶν ὀστῶν ἰδέᾳ. διὰ γὰρ τὴν τούτων φύσιν ἐπί τε δυοῖν βαδίζει σκελοῖν, καὶ τοῖς προσθίοις κώλοις ὥσπερ χερσὶ χρῆται, καὶ στέρνον πλατύτατον ἁπάντων τῶν τετραπόδων ἔχει, καὶ κλεῖς ὡσαύτως ἀνθρώπῳ, καὶ πρόσωπον στρογγύλον καὶ τράχηλον μικρόν. τούτων δ' ὁμοίων ὑπαρχόντων, οὐκ ἐνδέχεται τοὺς μῦς ἑτέροις ἔχειν. ἐπιτέτανται γὰρ οὗτοι τοῖς ὀστοῖς ἔξωθεν, ὥστε καὶ τὸ μέγεθος αὐτῶν καὶ τὸ σχῆμα μιμοῦνται. τούτοις δ' ἀκολουθοῦσιν, ἀρτηρίαι καὶ φλέβες, καὶ νεῦρα, καὶ ταῦτ' οὖν ὅμοια τοῖς ὁμοίοις ὀστοῖς. ἐπεὶ τοίνυν ἥτε μορφὴ τοῦ σώματος ὁμοιοῦται τοῖς ὀστοῖς, ἥτε τῶν ἄλλων μορίων φύσις ἕπεται τούτοις, πρῶτον ἁπάντων ἀξιῶ σε τῶν ἀνθρωπίνων ὀστῶν ἐμπειρίαν ἀκριβῆ λαβεῖν, μὴ κατὰ τὸ πάρεργον αὐτὰ θεασάμενον, ἀλλὰ μὴ δ' ἐκ βιβλίου μόνου ἀναλεξάμενον, ἃ τινὲς μὲν ὀστολογίας ἐπιγράφουσιν, ἔνιοι δὲ σκελετούς, ἔνιοι δ' ἁπλῶς περὶ ὀστῶν, οἷόν περ ἐστὶ καὶ τὸ ἡμέτερον, ὃ πέπεισμαι καὶ τῇ τῶν πραγμάτων ἀκριβείᾳ, καὶ τῷ τάχει τῆς ἑρμηνείας, καὶ τῇ σαφηνείᾳ, βέλτιον εἶναι τῶν ἅπασι τοῖς ἔμπροσθεν γεγραμμένων. ἔργον δέ σοι γενέσθω καὶ σπούδασμα, μὴ μόνον ἐκ τοῦ βιβλίου τὴν ἰδέαν ἑκάστου τῶν ὀστῶν ἀκριβῶς ἐκμαθεῖν, ἀλλὰ καὶ διὰ τῶν ὀμμάτων συντόνως αὐτόπτην αὐτὸν ἐργάζεσθαι τῶν ἀνθρωπείων ὀστῶν. ἔστι δ' ἐν Ἀλεξανδρείᾳ μὲν τοῦτο πάνυ ῥᾴδιον, ὥστε καὶ τὴν διδασκαλίαν αὐτῶν τοῖς φοιτηταῖς, οἱ κατ' ἐκεῖνο τὸ χωρίον ἰατροὶ μετὰ τῆς αὐτοψίας, ποιοῦνται. καὶ πειρατέον ἐστί σοι κἂν μὴ δι' ἄλλο τι, διὰ τοῦτο γοῦν αὐτὸ μόνον ἐν Ἀλεξανδρείᾳ γενέσθαι. μὴ δυνηθέντι δὲ τούτου τυχεῖν, οὐκ ἀδύνατον οὐδ' οὕτως ἀνθρώπων ὀστᾶ θεάσασθαι. ἐγὼ γοῦν ἐθεασάμην πάνυ πολλάκις, ἤτοι τάφων τινῶν, ἢ μνημάτων διαλυθέντων, ἀλλὰ καὶ ποταμὸς ἐπαναβὰς ποτὲ τάφῳ πρὸ μηνῶν ὀλίγων αὐτοσχεδίως γεγενημένῳ, διέλυσέ τε ῥᾳδίως αὐτόν, ἐπισυράμενός τε τῇ ῥύμῃ τῆς φορᾶς ὅλον τοῦ νεκροῦ τὸ σῶμα, τῶν μὲν σαρκῶν ἤδη σεσηπυιῶν, ἀκριβῶς δ' ἀλλήλοις ἔτι συνεχομένων τῶν ὀστῶν, ἄχρι μὲν σταδίου κατάντεις συρόμενον ἐπηνέγκατο. λιμνώδους δὲ αὐτὸ ἐκδεξαμένου χωρίου, τοῖς χείλεσιν ὕπτιον, πρὸς τοῦτο ἀπεκρούσθη τὸ τοῦ νεκροῦ σῶμα, καὶ ἦν ἰδεῖν καὶ τοῦτο τοιοῦτον, οἷόν περ ἂν ἐπίτηδες αὐτὸ παρεσκεύασεν ἰατρὸς εἰς διδασκαλίαν μειρακίου. ἐθεασάμεθα δέ ποτε καὶ λῃστοῦ σκελετὸν ἐν ὄρει κείμενον ὀλίγον ἐξωτέρου τῆς ὁδοῦ, ὃν ἀπέκτεινε μέν τις ὁδοιπόρος ἐπιχειροῦντα πρότερον ὁμόσε χωρήσας, οὐκ ἔμελλε δὲ θάψειν οὐδεὶς τῶν οἰκητόρων τῆς χώρας ἐκείνης, ἀλλ' ὑπὸ μίσους ἐπέχαιρον ἐσθιομένῳ τῷ σώματι πρὸς τῶν οἰω-

ὁ πίθηκος ὁμοιότατος ἀνθρώπῳ

3 Galen. "*Περι ανατομικων εγχειρησεων βιβλιον ά[-θ]*": in *Γαληνου απαντα Galeni Pergameni Opera omnia.* Basel: Andreas Cratander, 1538. Vol. 1, p. 119-197.

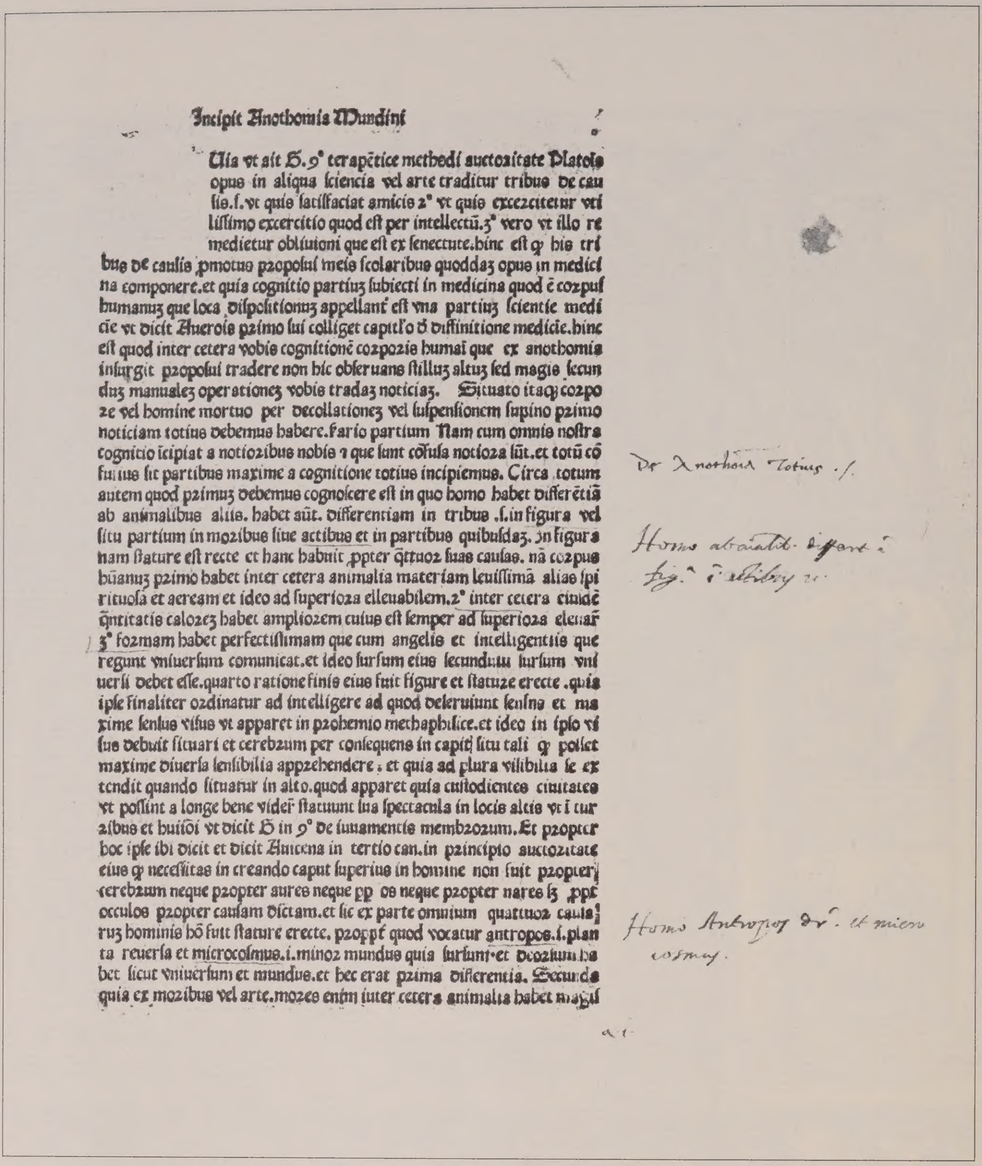
4 Galen. *De anatomicis administrationibus libri novem. Ioanne Guentherio Andernaco medico interprete.* Paris: Simon de Colines, 1531.

Galen's most significant contribution to the study of anatomy was his *De anatomicis administrationibus*, the text of which was lost during the Middle Ages. It was not until the early 1500s that the first nine books of the original Greek text were recovered (the final six books were not discovered until the twentieth century), and were published in this Greek edition of Galen's works, edited by Joachim Camerarius the Elder (1500-1574), Leonhart Fuchs (1501-1566), and Hieronymus Gemusaeus



(1542-1610). A Latin translation was prepared by Demetrio Calcondila (1423-1511), but remained unpublished until 1529 when it was issued with the title *De anatomicis aggressionibus* in a collection of Galenic texts edited by Berengario da Carpi. In February 1531 Guenther's revision of Calcondila's translation, renamed *De anatomicis administrationibus*, was finely printed by Simon de Colines in Paris. On its publication it became one of the foundations of anatomical study, and brought about the wholesale restructuring of anatomical investigation.

The illustrated title page of Guenther's Latin translation is the same as that used by Colines the previous year for the translation by Thomas Linacre (1460-1524) of Galen's *Methodus medendi, vel de morbis curandis libri quatuordecim*. The title page illustration is divided into three parts, each with its own theme. At the top right is the figure of the



Incipit Anothomia Mundini

Quia vt ait G. 9° terapētice methedi auctoritate Platois opus in aliqua sciencia vel arte traditur tribus de causis. s. vt quis satisfaciat amicis 2° vt quis exercitetur vtilissimo excercitio quod est per intellectū. 3° vero vt illo remedietur obliuioni que est ex senectute. hinc est q his tribus de causis pmotus proposui meis scolaribus quoddaʒ opus in medicina componere. et quia cognitio partiuʒ subiecti in medicina quod ē corpus humanuʒ que loca dispositionuʒ appellant est vna partiuʒ sciencie medicīe vt dicit Auerois primo sui colliget capitlo d diffinitione medicie. hinc est quod inter cetera vobis cognitionē corporis humāi que ex anothomia insurgit proposui tradere non hic obseruans stilluʒ altuʒ sed magis secunduʒ manualeʒ operationeʒ vobis tradaʒ noticiaʒ. Situato itaqʒ corpore vel homine mortuo per decollationeʒ vel suspensionem supino primo noticiam totius debemus habere. Fario partium Nam cum omnis nostra cognitio īcipiat a notioribus nobis ꝛ que sunt cōfusa notiora sūt. et totū cōfusius sit partibus maxime a cognitione totius incipiemus. Circa totum autem quod primuʒ debemus cognoscere est in quo homo habet differētiā ab animalibus aliis. habet aūt. differentiam in tribus .s. in figura vel situ partium in moribus siue actibus et in partibus quibusdaʒ. In figura nam stature est recte et hanc habuit pter q̄ttuor suas causas. nā corpus hūanuʒ primo habet inter cetera animalia materiam leuissimā alias spirituosā et aeream et ideo ad superiora elleuabilem. 2° inter cetera ciuidē q̄ntitatis caloreʒ habet ampliorem cuius est semper ad superiora eleuar̄ 3° formam habet perfectissimam que cum angelis et intelligentiis que regunt vniuersum comunicat. et ideo sursum eius secundum sursum vniuersi debet esse. quarto ratione finis eius fuit figure et stature erecte. quia ipse finaliter ordinatur ad intelligere ad quod deseruiunt sensus et maxime sensus visus vt apparet in prohemio methaphisice. et ideo in ipso visus debuit situari et cerebrum per consequens in capite situ tali q posset maxime diuersa sensibilia apprehendere; et quia ad plura visibilia se extendit quando situatur in alto. quod apparet quia custodientes ciuitates vt possint a longe bene vider̄ statuunt sua spectacula in locis altis vt ī turribus et huiusmodi vt dicit G in 9° de iuuamentis membrorum. Et propter hoc ipse ibi dicit et dicit Auicena in tertio can. in principio auctoritate eius q necessitas in creando caput superius in homine non fuit propter cerebrum neque propter aures neque pp os neque propter nares sʒ ppt occulos propter causam dictam. et sic ex parte omnium quattuor causaruʒ hominis hō fuit stature erecte. propp̄t quod vocatur antropos. i. planta reuersa et microcosmus. i. minor mundus quia sursum et deorsum habet sicut vniuersum et mundus. et hec erat prima differentia. Secunda quia ex moribus vel arte. mores enim inter cetera animalia habet magis

physician Saint Cosmas holding a book, signifying the study of medical theory. On the left is Saint Damian examining a phial of urine, symbolizing medical practice as a Christian exercise. Between the two saints is the allegorical figure of Christ the physician, miraculously healing a leper. In the middle section are representations of the authorities of medicine: in the central panel Aesculapius and Dioscorides, symbolizing the healing arts, and *materia medica* respectively, are shown as full figures. Between the pillars are portraits of four of the founding fathers of medicine: Hippocrates, Galen, Paulus Aegineta (625-690), and Oribasius (325-403), each with a book in his hands. At the foot of the title page a heated debate is taking place around the dissection table. Significantly there is no lector, and two men (possibly students) are handling anatomical parts. No single figure dominates this animated scene, which marks a break from the formality of previous public anatomical demonstrations. In several respects the scene foreshadows the title page of the *Fabrica*.

5 Mondino dei Luzzi. *Anatomia*. Padua: Petrus Maufer, [circa 1475]

A native of Bologna, and the son of an apothecary, Mondino dei Luzzi studied medicine at the University of Bologna under Taddeo Alderotti (circa 1210–1295), receiving his degree in 1300. Completed in 1316, *Anatomia* owes its great popularity to the simple, concise, and systematic arrangement of its contents. Manuscript copies of *Anatomia* circulated widely during the fourteenth and fifteenth centuries, becoming the textbook of choice at most universities for the teaching of anatomy for over two hundred years. The first printed edition, displayed here, was issued in Padua around 1475. It is a tall folio of twenty-two leaves, printed in rotunda type. Today it is very rare, with only three copies known. At least four other editions were published before the end of the fifteenth century, and many more in the sixteenth century.

Compiled as a practical teaching manual for students and surgeons, *Anatomia* is regarded as

the first textbook devoted exclusively to anatomical dissection, and therefore the first work to treat anatomy as a distinct discipline, even though Mondino, by his own admission, had only ever dissected two cadavers, both female. The brief text, with no scholastic apparatus, is organized around the processes of dissection, from the abdomen, to the thorax, and finally to the head.

ON LOAN FROM JONATHAN A. HILL

6 Mondino dei Luzzi. *Anatomia Mundini per Carpum castigate, & post modum cum apostillis ornata, ac noviter impressa.* Venice: Sessa, 1527. Bound with *Anatomia, quam de partibus humani corporis inscripsit* [Paris: Simon Du Bois], 1523.

Mondino's *Anatomia* was republished many times during the late fifteenth and early sixteenth centuries. This pocket size copy actually contains two editions of the *Anatomia*, both edited by Berengario da Carpi.

ON LOAN FROM
THE OSLER LIBRARY, MCGILL UNIVERSITY

7 *Fasciculus medicinae*. Venice: Caesar Arrivabene, 1522.

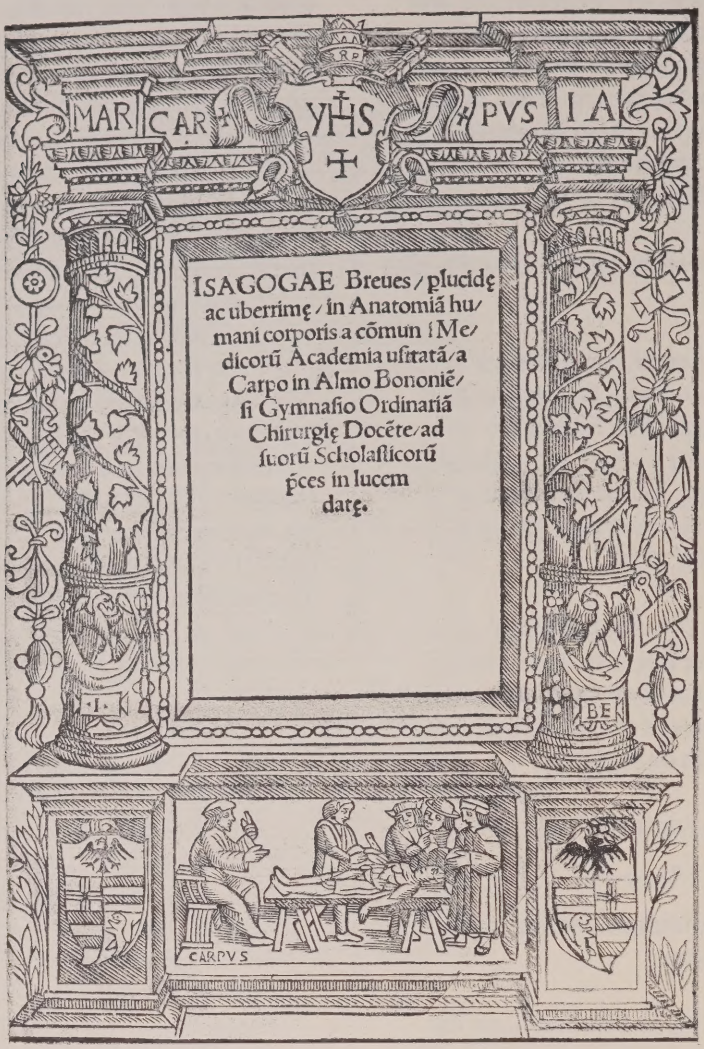
Before its first printing at Venice in 1491, the *Fasciculus medicinae* circulated in manuscript during the fifteenth century. It consists of three independent medieval treatises, and was intended as a manual for medical students and barbers. The identity of the compiler has often been attributed to Johannes de Ketham, about whom nothing is known beyond the fact that he was a German physician. He has sometimes been identified as a Johan von Kirchheim, who was active at the University of Vienna between 1455 and 1470, but a precise identification cannot be established. In fact some believe that Ketham had nothing to do with the *Fasciculus*, but was merely an owner of one of the manuscripts. However, his name does appear in the explicit to the 1491 edition, though it is missing from the 1493 Italian translation. The *Fasciculus* includes short treatises on uroscopy and phlebotomy by Pietro da Montagnana, advice on pestilence by Pietro da Tossignano, and Mondino's important textbook on anatomy.

The *Fasciculus* is the earliest printed book to include anatomical illustrations of any significance. Each section has a traditional diagram: urine glasses arranged in a circle helped the physician determine the nature of disease; a male figure is marked with the sites for bloodletting; the "zodiacal man" reflects the common belief that medicine was controlled by astrological phenomena; the "wound man" illustrates the various possible sites for injury, with the thorax and abdomen showing the outlines of internal organs; the pregnant woman is depicted in a frog-like squatting position – a common image in the late Middle Ages. All of the woodcuts were stock illustrations widely used in Europe for didactic purposes in the fourteenth and fifteenth centuries. Of particular interest is the woodcut of a dissection in progress. The instructor sits in his chair presiding over proceedings, while reading from a textbook of anatomy. Below is a surgeon or barber performing the dissection on a cadaver laid out on the dissection table. An ostensor points out the various bodily parts being discussed to the audience of students. This was the standard format for dissection from the early fourteenth century right up to the time of Vesalius. (see dissection scene above p. 12)

8 Jacopo Berengario da Carpi. *Commentaria cum amplissimis additionibus super Anatomia Mundini : una cum textu ejusdem in pristinum et verum nitorem redacto.* Bologna, 1521.**9** Jacopo Berengario da Carpi. *Isagogae breues, p[er]lucide ac uberrime, in anatomiã humani corporis a cõmuni medicorũ academia usitatã a Carpo in almo Bononiẽsi gymnasio ordinariã chirurgię docẽte, ad suorũ scholasticorũ p̃ces in lucem date.* Bologna, 1523.

Jacopo Berengario (1460-1530) taught anatomy at the University of Bologna after obtaining his medical degree there in 1489. His birth name was Barigazzi, but for unknown reasons he changed his name to Berengario, adding the suffix of his birthplace, Carpi.

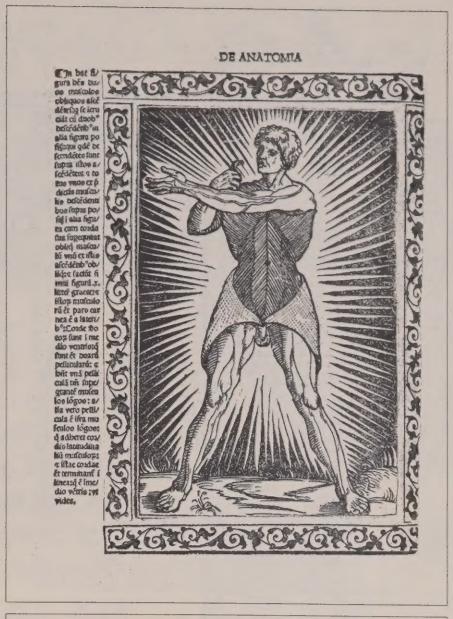
He learned anatomy and dissection from his surgeon-barber father, whom he often assisted. As a youth he was tutored by the great printer-scholar Aldo Manuzio (1449-1515), who spent from 1469 to 1477 teaching in Carpi. After completing his medical training, Berengario practiced for a time in Rome, where he amassed a fortune treating syphilis sufferers with mercury, frequently with dire consequences for his patients. His reputation badly tarnished, he left Rome in a hurry. In 1502 he moved to Bologna and became a lecturer in surgery at the university, where he was very popular with his students. At the outbreak of plague in Bologna in 1508 he became the city's Commissioner of Health, a post he held until 1512. With friends in high places, the avaricious and sometimes



violent Berengario escaped punishment for a number of incidents of assault and robbery. Yet he earned the reputation of being a good surgeon and developed a large clientele of wealthy patrons. In 1517 Lorenzo di Piero de' Medici, Duke of Urbino (1492–1519) received a head wound in battle, and Berengario was one of the practitioners summoned to attend to him. After a failed operation performed by another surgeon, Berengario tended the Duke and brought about a complete recovery. He recorded this experience in his *Tractatus de fractura calve sive cranei* (Bologna, 1518), which he dedicated to the Duke. The treatise was reprinted many times until well into the seventeenth century.

In 1514 Berengario produced an edition of Mondino's *Anatomia*, a work he admired for its practicality and brevity. Examining previous editions of Mondino, he found that parts of the original text were missing, while other parts were expanded or altered, and set about restoring Mondino's text to its original purity. Seven years later, in 1521 Berengario completed his monumental *Commentaria*. This lengthy folio of over a thousand pages was Berengario's most significant contribution to anatomical knowledge, and provided a complete guide to earlier anatomical writings. It was also one of the first printed anatomical works to contain illustrations.

In 1522 Berengario published a condensed version of the *Commentaria*, entitled *Isagogae breves*, a small quarto of eighty leaves, richly illustrated with woodcuts. It was republished, with changes and revisions, in 1523, 1530, and 1535, at Bologna, Strasbourg, and Venice respectively. *Isagogae breves* provides a concise yet thorough description of human anatomy, based on the evidence of the senses. The function of each part and its relation to the body as a whole are discussed, as well as the diseases to which each part is subject. Although an admirer of Mondino, Berengario often challenges his statements, and thereby by implication, the teachings of Galen. He is, therefore, one of the first sixteenth-century commentators to voice distrust of authority. Regarding anatomy as a progressive accumulation of knowledge, he reminds his readers not to



accept the word of others without independent verification.

Berengario was the first to describe several anatomical structures, including the ossicle of the middle ear, anastomosis between the portal vein and the inferior *vena cava*, the existence of a single umbilical vein, the tympanic membrane, and the vermiform appendix. He contradicts Galen's claim that the *rete mirabile*, which is to be found only in certain animals, exists in humans. He also lay to rest the persistent fallacy that the uterus consists of seven cells.

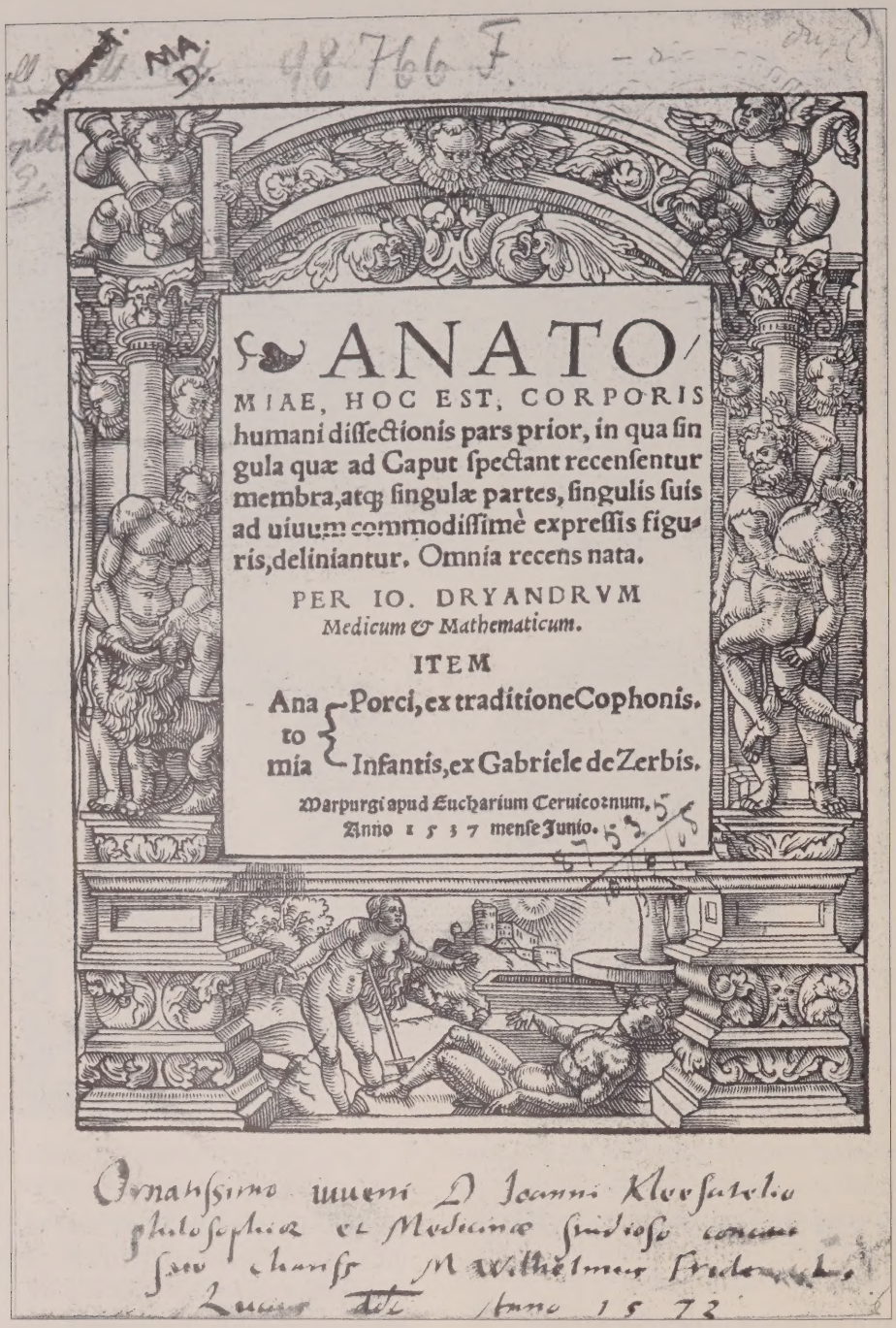
Berengario was one of the first to advocate private dissections, which, he reasoned, allowed investigation into those parts of the body, such as the bones, muscles, nerves, veins, and arteries, which could not be easily observed during a public dissection.

Among the most striking of Berengario's illustrations are six figures displaying the abdominal muscles, one of them surrounded by an aureole of sunbeams. There are five skeletal figures, some of them poorly drawn. Several improvements were introduced in the 1523 edition of the *Isagogae*. Illustrations of the heart and the brain especially were the best produced to that date.

The identity of the artist of the illustrations is unknown, though several candidates have been suggested, including Rosso de Rossi (1496-1541) of Florence, whose name has occasionally been associated with some of the illustrations in Charles Estienne's anatomical work (see below). The name of Ugo da Carpi who was known to be working in Bologna in the 1520s, has been suggested as the blockcutter.

An English translation by Henry Jackson with the title *Μηκροκοσμογραφια, or A Description of the Little World or Body of Man, being a Practical Anatomy*, was issued in 1660 – 125 years after the publication of the last Latin version.

COMMENTARIA ON LOAN FROM DR EUGENE S. FLAMM

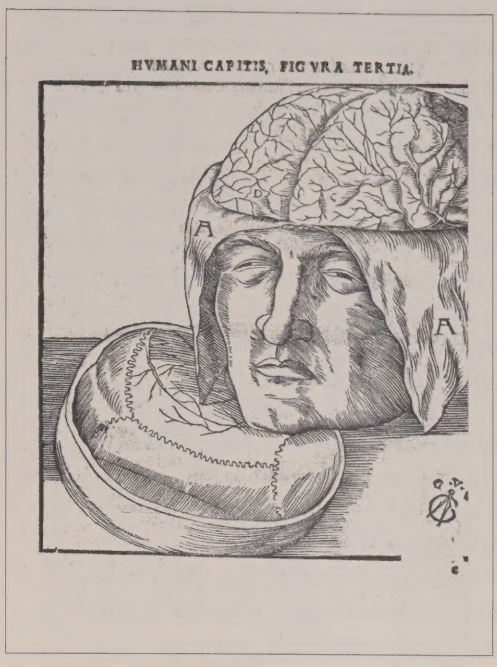


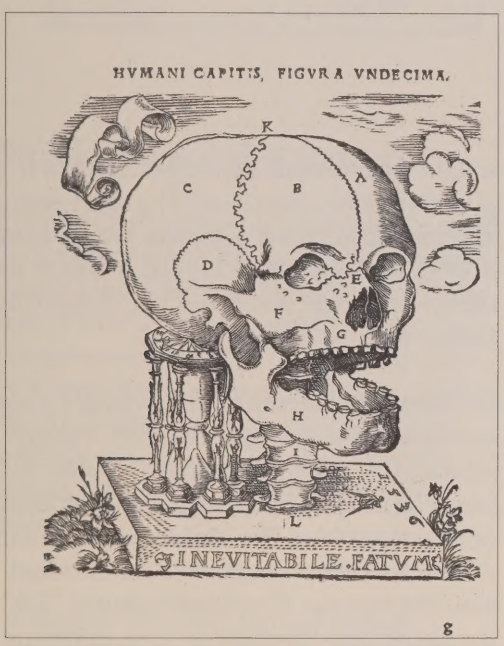
10 Johann Dryander. *Anatomiae, hoc est, corporis humani dissectionis pars prior : in qua singula quae ad caput spectant recensentur membra, atq; singulae partes, singulis suis ad uiuum commodissimè expressis figuris, deliniantur : omnia recens nata.* Marburg, 1537.

A contemporary of Vesalius, Johann Eichmann (1500-1560), better known under his adopted Hellenized name of Dryander, was a native of Wetter in Upper Hesse (Germany). After obtaining his M.A. from the University of Erfurt in 1524, he continued his studies in medicine at Bourges, before moving to the University of Paris in 1528. Dryander left Paris in 1533 – the year in which Vesalius enrolled at the same institution. There is no evidence that the two men ever met each other. After Paris Dryander completed his medical degree at Mainz, and in 1534 was appointed royal physician of Koblenz and Trier.

The University of Marburg, founded in 1527 by Philip I, Landgrave of Hesse (1504-1567), was the first Protestant university. In 1535 Dryander was appointed as the chair of medicine, and spent the rest of his academic life in Marburg, becoming Rector of the University from 1547 to 1554. He was also appointed physician to Philip of Hesse, but found that his duties at court brought in a reduced salary, and also prevented him from devoting his full attention to teaching. Dryander also published a number of books on mathematics.

As in other European universities the medical curriculum at Marburg was based on the writ-





ings of Galen, the *Aphorisms* of Hippocrates, and the *Canon* of Avicenna. To supplement these works, Dryander planned a comprehensive treatise on the anatomy of the whole human body. The plan was not realized, but the first part, devoted to the head, was issued in September 1536 with the title: *Anatomia capitis humani*. The book was essentially a collection of woodcut illustrations with explanatory captions. A second edition followed, in June 1537 with the revised title *Anatomiae, hoc est, corporis humani dissectionis pars prior.* The new edition, a quarto of seventy-two pages, had a longer introduction, more detailed illustrations, and new figures of the thorax, heart, and lungs, increasing the number of illustrations to twenty-three. The book concludes with a six-page section containing brief extracts from a thirteenth-century text attributed to Copho, entitled *Anatomia porci*, and *De generatione embrionis* written by Gabriele Zerbi (1445-1505), late professor of medicine at the University of Bologna.

In the dedication to Philip of Hesse, Dryander stresses the fundamental importance of anatomy to medicine, and like Berengario, encourages his students to conduct their own dissections. He emphasizes the application of anatomy in surgery and pathology to determine the cause of death and the nature of disease.

The woodcut illustrations, the sketches for which were drawn by Dryander himself, were cut by a local Marburg blockcutter, Georg Thomas, whose cipher of a compass (the symbol of Saint Thomas) appears on sev-

eral illustrations. The woodcuts present a sequential dissection of the head, and display the surgical instruments necessary for the task, along with instructions on their use. Dryander provides accurate depictions of all parts of the brain. Other illustrations depict a dissection of the neck, the base of the skull, the jaw, and the teeth. Four additional illustrations, copied from Berengario, describe the skull and its sutures. With each part of the brain Dryander associates a particular faculty or sense. For instance, multiple cavities in the *pia mater* fill with air to give us our sense of smell.

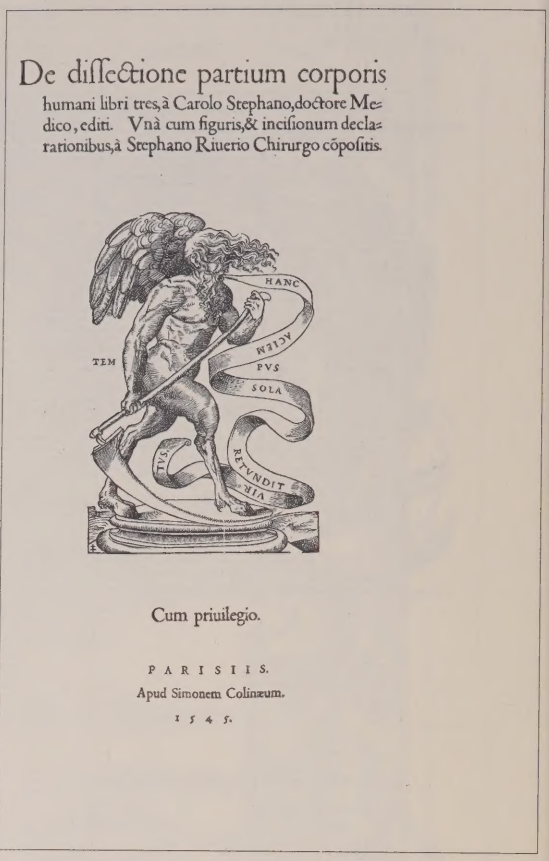
Dryander, like Berengario, felt a close affinity with Mondino, and in 1541 published an annotated version of Mondino's text, amended in the light of the recently recovered *De anatomicis administrationibus* of Galen. Dryander acknowledges Vesalius, and others "who grace the subject of anatomy."

He also borrowed without permission certain illustrations from Vesalius's *Tabulae anatomicae sex*. Vesalius mentions the "plagiarist" in his letter to his printer Johannes Oporinus in the *Fabrica*, chastising him as a "slave to the sordid printer at Marburg and Frankfurt," without knowing his true identity. In the introduction to the *Fabrica*, Vesalius gives Dryander a favourable mention, but when he found out that Dryander had privately criticized him for his lack of respect towards his former teacher Johann Guenther, Dryander's name was deleted from the 1555 edition of the *Fabrica*.

11 Charles Estienne. *De dissectione partium corporis humani libri tres.* Paris: Simon de Colines, 1545.

Charles Estienne (circa 1505-1562), also known by his Latin name Carolus Stephanus, was a member of a distinguished family of printer-scholars. He studied medicine under Sylvius at the University of Paris, receiving his degree in medicine in 1540. Between 1544 and 1547 he was a lecturer of anatomy at the Faculty of Medicine, Paris, but in 1551 resigned from his post in order to devote his energies to the family's printing business. In 1561 he was imprisoned for debt, and spent the final two years of his life in jail.

Although the imprint of Estienne's volume post-dates that of the *Fabrica*, the book was actually completed in 1539, but publication was delayed by a legal wrangle between Estienne and Etienne de la Rivière [Stephanus Riverius], until then a relatively unknown barber-surgeon and artist employed by Estienne. Rivière had


De diſſectione partium corporis
humani libri tres, à Carolo Stephano, doctore Medico, editi. Vnà cum figuris, & inciſionum declarationibus, à Stephano Riuerio Chirurgo cõpoſitis.

Cum priuilegio.

PARISIIS.
Apud Simonem Colinæum.
1545.

sought an injunction to compel Estienne to display his name as co-author. The court eventually decided in favour of Rivière, whose name duly appeared on the title page. A French translation, containing two plates not included in the Latin edition, was issued in 1546.

De dissectione partium corporis humani is a good example of fine Parisian sixteenth-century printing by Estienne's stepfather Simon de Colines. The sixty-two full-page woodcut illustrations printed from fifty-six blocks are striking works of art, full of mannerist conceits and macabre touches. One block is signed "S.R" [i.e. Stephanus Riverius]. Several blocks are marked with the name of the artist Jean Jollat (active 1530-1545), and are variously dated 1530, 1531 or 1532. Others bear the emblem of the Lorraine cross, thought to be the monogram of the blockcutter Jacquemin Woeiriot.

The illustrations in Estienne's book vary in quality, but overall they display considerable artistry and originality. The outlines of blocks inserted into a number of the figures depicting internal structures, are clearly visible in some of the impressions. It has been suggested that the blocks were originally prepared for a completely different purpose, and that the anatomical element was added later. The female figures were modelled on a series of erotic mythological engravings, entitled *Loves of the gods* by the Italian artist Giovanni Jacopo Caraglio (d. 1565). The images have been altered by the insertion of anatomical blocks

which disguise their original erotic intention.

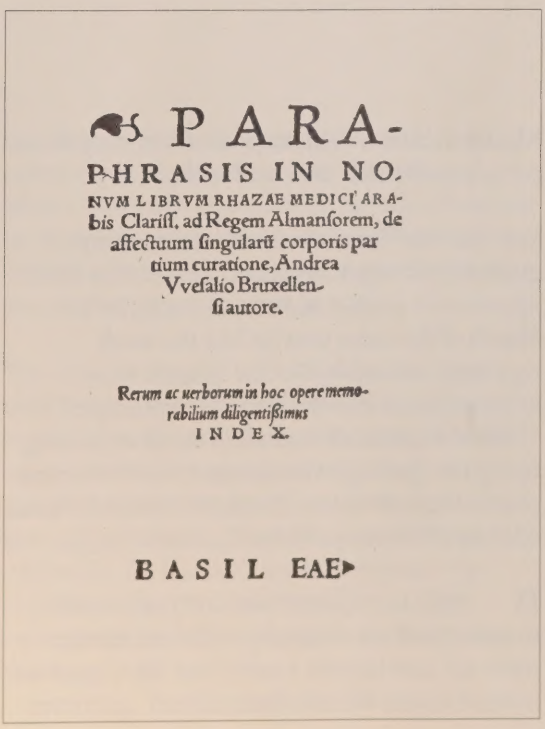
The text of *De dissectione* is written in the spirit of the Galenic tradition, but Estienne occasionally contradicts Galen and at other times supplements what Galen had written. When he is not in agreement with Galenic teaching, Estienne is conciliatory in his approach, in contrast to the much more aggressive Vesalius. Like Berengario da Carpi and Vesalius, Estienne affirms that the *rete mirabile* is absent in humans.

12 Andreas Vesalius. *Paraphrasis in nonum librum Rhazae medici arabis clariss. ad Regum Almansorem de affectuum singularum corporis partium curatione.* Basel: Robert Winter, 1537.

In February 1537 Vesalius published his bachelor's dissertation, a paraphrase of the ninth book of the compendium of therapeutics by the Arab-Persian physician, Rhazes, written for King Al-Mansūr of Khurasan.

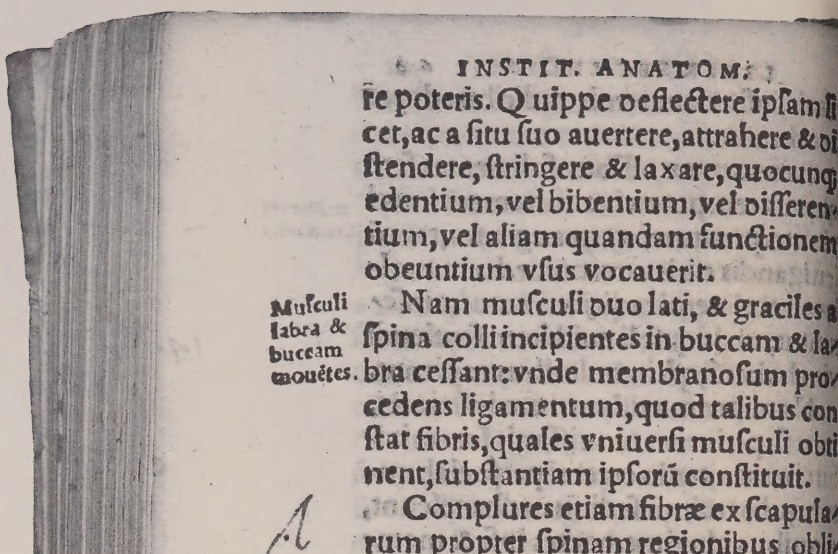
The *Kitāb al-Mansūrī*, which was translated into Latin by Gherardo da Cremona (1113 or 1114-1187) in the twelfth century as *Liber ad Almansorem*, was based mainly on the texts of Hippocrates and Galen. The first printed version of Gherardo's translation of *Ad Almansorem* (as the book is commonly referred to) appeared in Milan in 1481; it was reprinted in Venice in 1497, and in Lyon in 1510.

Observing that Rhazes's text had over the years become corrupt through mistranslations and misreadings, compounded by an unintelligible lexicon, Vesalius saw a need to revise Rhazes, not in the form of a literal translation, but as a paraphrase, in which obscure passages were explained. In addition, stylistic improvements were made, glosses and marginalia were added, and the confusing names of drugs and medications were clarified. The subject of the dissertation was probably suggested to Vesalius by his teachers in Paris, although the manuscript of his grandfather's commentary of


PARA-
PHRASIS IN NO.
NVM LIBRVM RHAZAE MEDICI ARA-
bis Clariſſ. ad Regem Almanſorem, de
affectuum ſingularũ corporis par
tium curatione, Andrea
Veſalio Bruxellen-
ſi autore.

Rerum ac uerborum in hoc opere memorabilium diligentiſſimus
INDEX.

BASILEAE



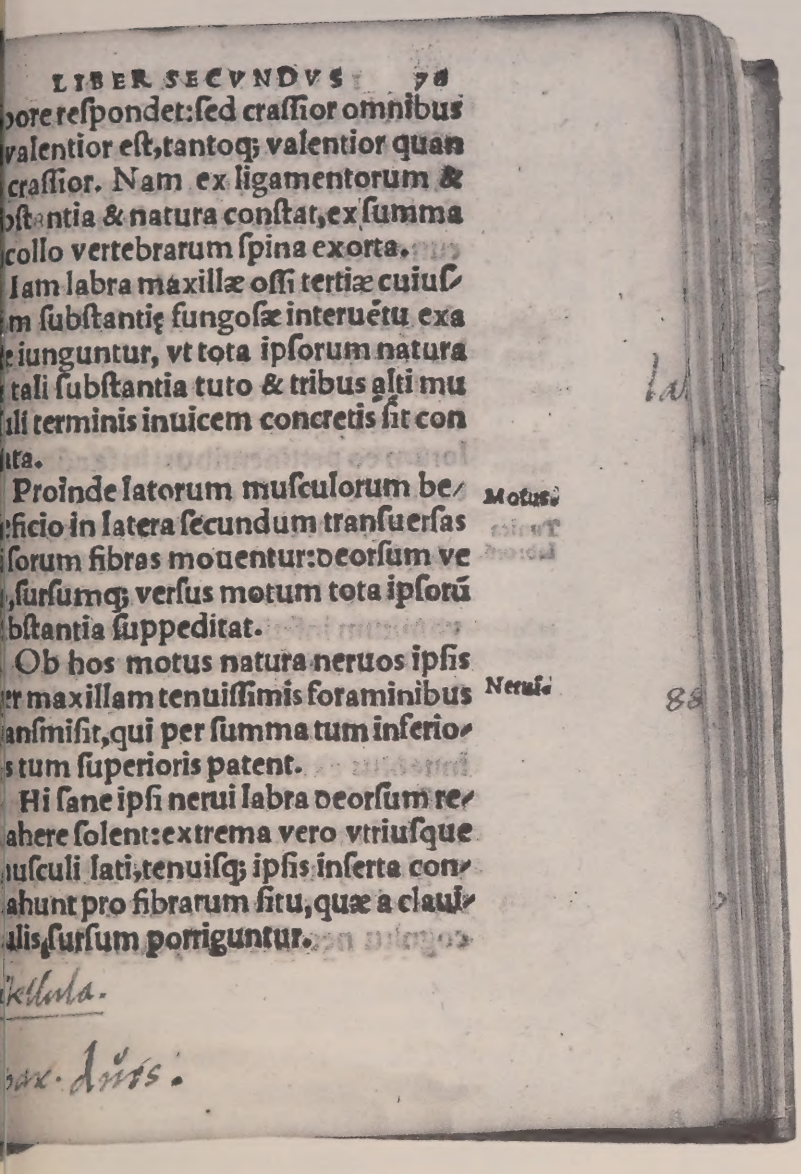
Annotations in Vesalius's hand

Rhazes which was in his possession, may have contributed to his choice of topic.

Vesalius was dissatisfied with the undistinguished printing of his dissertation when it first appeared in Leuven in February 1537, for in March of the same year he had the work reprinted in Basel by Robert Winter. Most noticeable was the change in the spelling of "Galen" from block capitals in the first printing, to regular spelling in the second. Vesalius's paraphrase was also later included in Heinrich Petri's edition of Rhazes published in Basel in 1544.

13 Johann Guenther. *Institutionum anatomicarum secundum Galeni sententiam ad candidatos medicinae libri quatuor ... ab Andrea Vesalio Bruxellensi, auctiores & emendatiores redditi.* Venice: D. Bernardini, 1538.

One month after the publication of the *Tabulae anatomicae sex* in 1538, Vesalius completed a revision of Johann Guenther's *Institutionum anatomicarum secundum Galeni sententiam,* which served as a digest of Galen's writings and as a textbook on dissection. Originally published in Paris in 1536, and again in Basel the same year, the *Institutiones anatomicae* enjoyed great success with Guenther's students, including Vesalius.
In the flattering prefatory letter addressed to Johannes Heems of Armentières (Armenterianus), Professor of Medicine at the University of Leuven, dated 5 May 1538, Vesalius reveals his reasons for revising Guenther's text a mere


LIBER SECVNDVS 78
pore reſpondet: ſed craſſior omnibus
valentior eſt, tantoq; valentior quan
craſſior. Nam ex ligamentorum &
ſtantia & natura conſtat, ex ſumma
collo vertebrarum ſpina exorta.
Iam labra maxillæ oſſi tertiæ cuiuſ-
m ſubſtantię fungoſæ interuẽtu exa
e iunguntur, vt tota ipſorum natura
tali ſubſtantia tuto & tribus ąlti mu
ili terminis inuicem concretis ſit con
ita.
Proinde latorum muſculorum be- Motus
ficio in latera ſecundum tranſuerſas
ſorum fibras mouentur: deorſum ve
,ſurſumq; verſus motum tota ipſorũ
bſtantia ſuppeditat.
Ob hos motus natura neruos ipſis
r maxillam tenuiſſimis foraminibus Nerui
anſmiſit, qui per ſumma tum inferio-
s tum ſuperioris patent.
Hi ſane ipſi nerui labra deorſum re-
ahere ſolent: extrema vero vtriuſque
uſculi lati, tenuiſq; ipſis inſerta con-
ahunt pro fibrarum ſitu, quæ a clauí-
alis, ſurſum porriguntur.

two years after the original publication, and without Guenther's authorization. Because of the careless negligence of the printers who produced the 1536 edition, and as many people had asked him to undertake the revision, Vesalius acceded to the request "for the benefit of many", and is confident that "the most liberal and most learned" Guenther would not be offended. In republishing Guenther's work Vesalius corrected and expanded Guenther's text with his own anatomical findings. In this regard the edition resembles an annotated copy of Guenther's original. Seen in another light, it was an opportunity for Vesalius to express his personal vanity and to display his considerable learning.

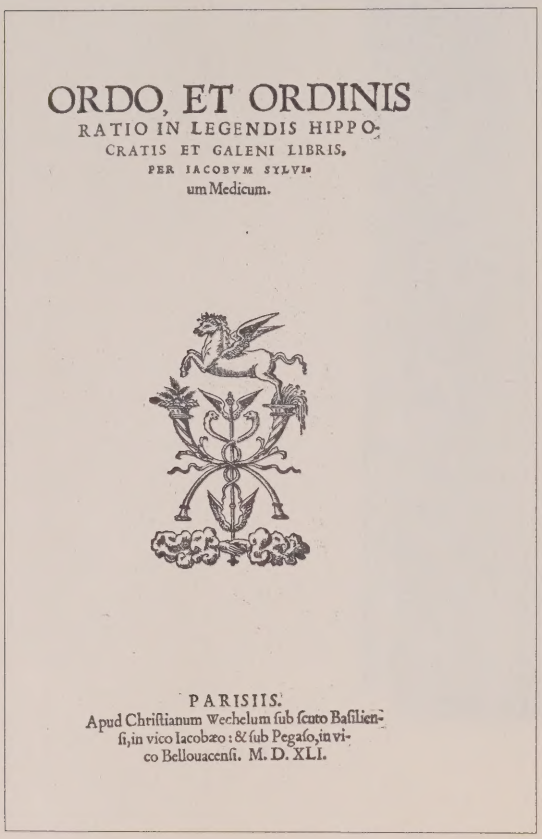
The revised version was printed by Bernardino dei Vitali in Venice in June 1538. An undated edition was reprinted around 1540, also at Venice. Both of these editions mention Vesalius on their title pages, as does a later Wittenberg edition of 1585, but his name is omitted from the edition printed at Pisa in 1550.

The copy on display is Vesalius's own copy, which is richly annotated, evidently with a new edition in mind. The annotations correct more errors in typography and layout, and make significant emendations to the text, through additions, deletions, and revisions. Although the *Institutiones anatomicae* were republished at least four times, no edition incorporates the changes made by Vesalius in his copy.

ON LOAN FROM STUART ROSE

14 Jacobus Sylvius. *Ordo, et ordinis ratio in legendis Hippocratis et Galeni libris.* Paris: A. Wechel, 1541.

This work, together with *In Hippocrates et Galeni physiologiae partem anatomicam isagoge,* published in 1542, represent Sylvius's pedagogical activity in Paris during Vesalius's student years in the French capital. Both works were significant contributions as student aids in arranging, organizing, and abstracting the vast corpus of Galen. His efforts, which were much appreciated by his students, brought him success and popularity.


ORDO, ET ORDINIS
RATIO IN LEGENDIS HIPPO-
CRATIS ET GALENI LIBRIS,
PER IACOBVM SYLVI-
um Medicum.

PARISIIS.
Apud Christianum Wechelum sub scuto Basilien-
si, in vico Iacobæo: & sub Pegaso, in vi-
co Bellouacensi. M. D. XLI.

15 [Andreas Vesalius. *Tabulae anatomicae sex.*]

Jost de Negker. *Arteria magna haorti ex sinistro cordis sinu oriens, & vitalem spiritum toti corpori deferens, naturalemq; calorem per contractionum & dilatationem temperans.* [Augsburg, circa 1540]

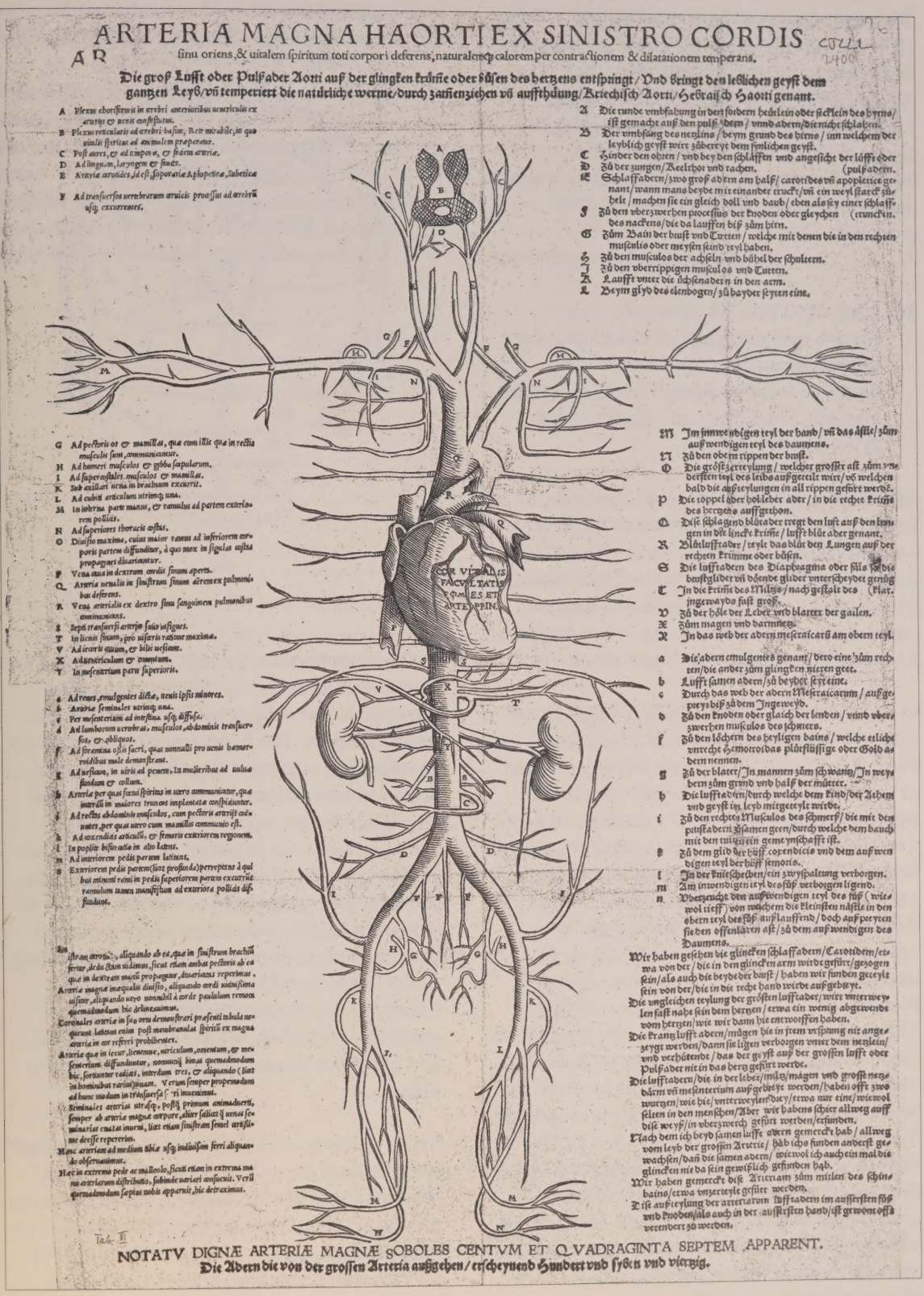
On 6 December 1537 Vesalius performed his first official dissection on a nineteen-year old youth. A surviving notebook written by Vitus Tritonius, a student who attended one of Vesalius 's classes, records the event. It notes that Vesalius abandoned the old format, established by Mondino in the early fourteenth century, by combining the roles of lecturer, dissector, and ostensor. Vesalius also recommended his students to discard Mondino's text in favour of the anatomical writings of Galen, and Guenther's dissection manual, *Institutiones anatomicae.*

The *Tabulae anatomicae sex* were first printed in Venice in 1538 by Bernardino dei Vitali, who had also been responsible for Berengario da Carpi's *Isagogae breves* of 1535, and Guenther's *Institutiones anatomicae* in 1538. The *Tabulae anatomicae* were printed without a title page, in the form of six large broadsides, with dimensions of approximately 51 x 34 cm. The woodcut illustrations are surrounded by text, explaining the lettered references on the figures.

The first three tables, drawn by Vesalius himself, depict the portal, caval, and arterial systems. Each part is named in Latin and Greek, and occasionally also in Arabic and Hebrew. Many of the Latin terms, which had been coined by Sylvius and Guenther, often in Hellenized forms, were designed to replace the Arabic "barbarisms" about which Vesalius and other humanists frequently complained.
The second table shows the "azygos" vein, a term coined by Guenther, meaning literally "a vein without a partner." In discussing this vein, Vesalius enters the controversy on bloodletting, on which he subsequently elaborates in his *Venesection Letter* (see below #16).

The three remaining figures, of a skeleton of an eighteen-year old youth that Vesalius himself had prepared (*Tabulae* IV-VI), were drawn by Jan Stefan van Calcar (circa 1499-circa 1546), a Flemish artist from the studio of Titian.
In spite of their undoubted popularity, the *Tabulae anatomicae* are today extremely rare; only two complete copies are known to have survived, one at the *Biblioteca Nazionale Marciana* in Venice, the other at the Hunterian Library at the University of Glasgow. A number of facsimiles have been published, firstly in London in 1874, secondly in Leipzig in 1920. The plates were also reproduced in *Icones anatomicae,* jointly published in 1934 by the New York Academy of Medicine and the University of Munich.

In his letter to the printer Johann Oporinus which introduces the *Fabrica,* Vesalius complains about certain plagiarisms of his *Tabulae anatomicae,* identifying them by their place of origin, rather than by the names of the perpetrators, which were probably unknown to him at that time. The plagiarist identified as the "babbler of Augsburg" was Jost de Negker (circa 1485-circa 1544), also known as Jobst de Necker, a Flemish woodcutter who was active in Augsburg.



Negker's copies of the figures are scarcely distinguishable from the originals. In the text that accompanies the first table Negker acknowledges Vesalius as the author, and justifies the addition of a German text to accompany the Latin original:

> because this artistic description of all the vessels and bones of the body is extremely necessary for every surgeon, and since in Germany surgeons only rarely understand Latin, I, Jobst de Necker, as a lover of the German nation have translated these artistic plates to the advantage of the Germans and have so far as possible transformed from good Latin into the unregulated German tongue the principal matters which never before have been described in German

The problem of an inadequate German anatomical terminology was also faced by Alban Thorer in his German translation of the *Epitome* of 1543.

The chart displayed here corresponds to Table III of the *Tabulae anatomicae sex*. It shows the heart and aorta and 147 of its branches, including the *rete mirabile*, which despite Galen's assertions, does not in fact exist in humans. The fact that it is depicted in Vesalius's work is an indication that he was still very much under the influence of Galen's teachings.

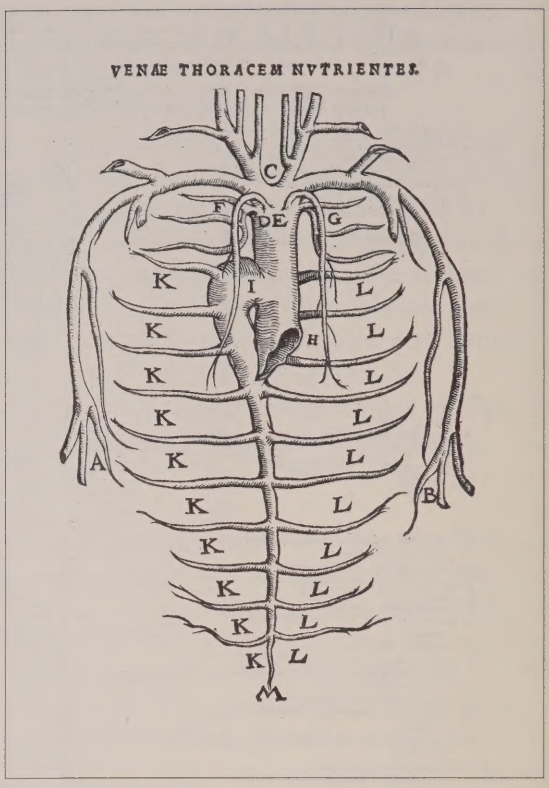
ON LOAN FROM DR BRIAN MORRISON

16 Andreas Vesalius. *Epistola, docens venam axillarem dextri cubiti in dolore laterali secandam melancholicum succum ex venae portae ramis ad sedem pertinentibus, purgari.* Basel: Robert Winter, 1539.

Bloodletting (phlebotomy) had been used as a fundamental therapeutic measure in the treatment of certain ailments since the time of Hippocrates, and was embedded in Greek humoral pathology. The practice, which used lancets, cupping glasses, or leeches, was still being performed until well into the twentieth century.

In 1514 an outbreak of pleurisy, or "pain in the side" (*dolor lateralis*), as it was called, struck Paris. A local physician, Pierre Brissot, claimed to have had great success in treating the disease by venesection. Brissot's account triggered a torrent of controversy, which raged for several years. While enthusiastically endorsing the ancient Greek procedures for bloodletting, Brissot in true humanist fashion, takes the opportunity to denigrate Arab methods of bloodletting, which he claimed had deviated from the teachings of Hippocrates and Galen. The dispute revolved around the method of bloodletting to be used: revulsion or derivation. In ancient medicine, infection was believed to be the result of local humours that had escaped from the blood stream. The direction of flow of the humour could be induced to proceed in the opposite direction towards a spot where it could be evacuated from the body. The issue of whether to draw blood from the same or opposite side to the infection became a major bone of contention for sixteenth-century practitioners.

The Arab method of bloodletting was almost exclusively revulsive. Blood was taken from a vein as distant as possible from the infection. Bleeding close to the infection, it was believed, would increase the flow of toxic blood to the site of the infection, and thereby aggravate the disease. As the controversy escalated, arguments for and against the two positions became increasingly heated.



In the *Paraphrasis* of Rhazes, Vesalius made frequent references to bloodletting. In 1538 he returned to the subject briefly in the *Tabulae anatomicae sex*. The following year he takes up the question at greater length in his *Epistola, docens venam axillarem dextri cubiti in dolore laterali secandam melancholicum succum ex venae portae ramis ad sedem pertinentibus, purgari* [A letter, teaching that in cases of pain in the side, the axillary vein of the right elbow be cut, and that the melancholic juice is purged from the branches of the portal vein extending to the fundament] known, for the sake of brevity, as the *Venesection Letter*. It was first published by Robert Winter at Basel in 1539, and again five years later, by Heinrich Petri in 1544.

In the *Venesection Letter* Vesalius placed himself in the Brissot camp. Still a disciple of Galen, Vesalius based his rationale for the site of venesection on an understanding of the significance of the azygos system. He agreed with the Hippocratic and Galenic view that venesection should normally be employed at a point as close as possible to the site of the pain, but he adds that this procedure should only be carried out in cases of pleurisy, and not for other kinds of pains in the side. He concurs with Hippocrates that in cases of thoracic pain beneath the diaphragm, purgatives should be used. But in cases of inflammation of the chest above the diaphragm, Vesalius warns that noxious blood should never be drawn through a vital organ like the heart. Because of the position of the azygos vein, which issues from the right of the *vena cava* above the heart, in line with the

veins of the right arm, blood should be drawn from the axillary vein of the right elbow.

Vesalius supports his argument with a rough sketch showing the veins that nourish the thorax, and those that are connected to the arms. The drawing was not intended to be a realistic representation, as is evident from the exaggerated size and configuration, but as a teaching device to be used in his lectures.

DE HUMANI CORPUS FABRICA 1543

17 Andreas Vesalius. *De humani corporis fabrica libri septem.* Basel: J. Oporinus, 1543.

PRINTING IN BASEL

The question has frequently been raised as to why Vesalius chose to have the *Fabrica* printed in Basel instead of nearby Venice, which would have been the logical choice, as one-fifth of the total number of medical books published in the fifteenth and early sixteenth centuries had been produced there. The first collected edition of Galen's works in Latin was issued in 1490 and in Greek in 1525. The Venetian presses could boast a host of other famous medical works.

Venice had earned a reputation for the fine printing of scholarly editions. In terms of the number of books printed, and the number of printers and publishers active in the city-state, Venice occupied a predominant position within the European book trade. But in the first three decades of the sixteenth century political turmoil, French invasions, and defeat by the League of Cambrai, resulted in the widespread disruption of commerce in the Republic. The Venetian printing and publishing industry was deeply affected. As a direct result of the dwindling Venetian market, commercial opportunities were seized upon by printers north of the Alps, as the main centres of printing shifted away from Northern Italy to Paris, Lyon, Antwerp, and Basel.

The growing reputation of Basel for scholarly printing was largely due to the patronage of Desiderius Erasmus (1466-1536), who in 1515 transferred publication of his Greek translation of the New Testament from Aldus in Venice to Johann Froben (circa 1460-1527) in Basel. Very soon the Swiss city became the leading centre of publishing in the scholarly languages, particularly in the disciplines of theology and science. The tradition that had been begun by Johann Amerbach (d. 1513) and Andreas Cratander (circa 1490-circa 1540) was continued by the Froben dynasty, and, from 1542, by Johannes Oporinus (1507-1568). Basel had also earned a place of preeminence in the printing of woodcut illustrations, mainly through the collaboration of Hans Holbein the younger (1497-1543) with the Froben printing house. That reputation was further enhanced by the publication in 1542 of Leonard Fuchs's magnificent botanical treatise *De historia stirpium.*

Other factors, too, contributed to Basel's rise to prominence. It was home to one of the leading universities in Europe. Founded in 1460, it played a prominent role in the Protestant Reformation. The city provided refuge to such humanist scholars as Erasmus, Hans Holbein, Huldrych Zwingli (1484-1531), Johannes Oecolampadius (1482-1531), and other leading intellectuals who added to the city's reputation for religious tolerance and scholarship. Situated on the Rhine, the city was ideally placed geographically on the main European trade routes, with convenient access to France, Germany, and Italy as well as northern markets.

THE PRINTER

Johannes Oporinus (1507-1568), who was born Johan Herbst, had a multi-faceted career. From a family of painters, his first inclination was to follow in his father's footsteps. But he excelled at school and instead was sent to boarding-school in Strasbourg where he studied Latin and Greek for four years. Returning to Basel, and with insufficient means to enter university, he supplemented his income from teaching by copying Greek theological manuscripts in the Froben printing house. One of his tasks was to help with the preparation of the text of Erasmus's edition of *Irenaeus*. It was at this time, that, following the fashion of the day, he Hellenized his name to Oporinus, meaning "autumn". He now began to study law, and learned Hebrew.

In 1526 his employer Johannes Froben badly injured his foot and faced the prospect of amputation. Philippus Aureolus Theophrastus Bombastus von Hohenheim (1493-1541), better known as Paracelsus, was sent for and succeeded in healing Froben. Paracelsus stayed on in Basel and gave lectures at the University of Basel, which were attended by Oporinus, who now turned his thoughts towards a career in medicine. He became Paracelsus's secretary, laboratory assistant, and valet, but finding it impossible to work for the highly eccentric and unpredictable physician, he eventually left his employment and, disillusioned, abandoned all thoughts of a medical career. He returned to teaching and, as his reputation as a classicist grew, he was rewarded with successive professorships in Latin and Greek in 1533 and 1537 respectively. In 1536, while still holding his university position, he purchased the Cratander printing house in partnership with three other local printers, Robert Winter, Thomas Platter (1499-1582), and Balthasar Lasius (active 1536-1543). One of the books issued under their joint imprint was Guenther's *Institutiones anatomicae*. After several years the partnership began

to deteriorate, and was eventually dissolved. Oporinus, having already resigned his university position, struck out on his own, and in 1542 established his own printing house, which flourished for the next twenty-four years. He became the foremost printer of his generation in Basel, acquiring a deserved reputation for the accuracy of his printing.

Among his stocks in trade were editions of the classics, many of which he himself edited. He printed more than fifty Greek texts. Also prominent among his output were works by the Church Fathers and the Protestant Reformers of his own day. John Foxe (1516-1587) worked as a corrector in Oporinus's printing shop between 1555 and 1559, and had the original Latin version of the *Book of Martyrs* published by Oporinus in 1559. Because of his close association with the Reformers, Oporinus was placed on the first *Index librorum prohibitorum* issued by Pope Paul IV in 1559. He also fell afoul of Protestant censorship over the printing of Theodore Bibliander's Latin translation of the *Qur'an*, for which he was briefly imprisoned.

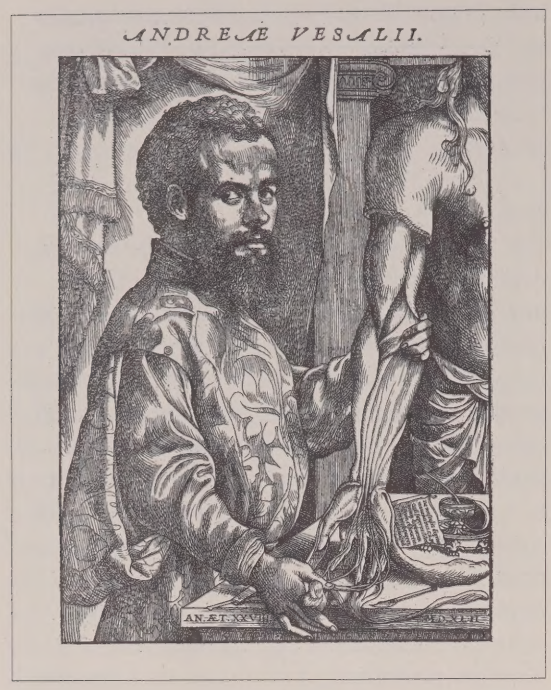
His scholarly background in medicine, the ancient languages, and his fine printing record made Oporinus the ideal choice of printer for Vesalius's great work. Besides the two editions of *Fabrica*, and the two versions of the *Epitome*, in Latin and German, Oporinus also printed the second edition of Vesalius's *Paraphrase* of Rhazes, the *Venesection Letter*, and the *China Root Letter*.

On 24 August 1542 Vesalius wrote to Oporinus that the woodblocks for the *Fabrica* were ready for shipment to Basel; they arrived safely in the middle of September. The blocks were accompanied by proofs and detailed instructions for their placement. Vesalius stated his intention to travel to Basel for the duration of printing, and would bring with him the privilege granted by the Senate of Venice against unlawful printing. A second privilege, from the Holy Roman Empire, would arrive from Brussels. Finally a third privilege, from the King of France, had been promised. Work on the monumental volume began probably on 1 October 1542. In January 1543 Vesalius arrived in Basel to commence the arduous task of proof-reading. *Fabrica* was completed by the end of July 1543. It was printed on demy-size paper, probably manufactured locally. Each gathering consists of three quired folio sheets, producing twelve pages. There is total number of 711 pages. The text is printed mainly from sixteen-point roman type. Italicized passages are composed in "Basel italic" which had replaced Aldine italic in popularity. Each line of text measures 18.5 centimetres, the average number of lines per page being fifty-seven. There are about five thousand characters to the page, excluding spaces.

TITLE PAGE

The famous woodcut title page of the *Fabrica*, depicting the tumultuous scene of a public anatomy conducted by Vesalius in Padua, has received extensive commentary, and a wide range of interpretations. The outdoor location, probably in the courtyard of the university, is reminiscent of a theatrical spectacle. At the same time it is a pictorial representation of a revolutionary new method of expressing and communicating knowledge. In calculated contrast to the traditional dissection scene as depicted in the *Fasciculus medicinae*, in the centre is the figure of the leading actor, Vesalius, performing a dissection on a female cadaver, opened to display the abdominal cavity with some of the organs removed. Towering above the dissection scene is an articulated skeleton, reflecting Vesalius's custom of displaying a skeleton at his anatomy demonstrations and symbolizing the importance of osteology to the study of anatomy. In this scene Vesalius has taken the initiative and is performing the combined roles of instructor, dissector, and ostensor – one of the basic tenets of the "new" anatomy he was promoting. Gone is the isolated lector in his elevated chair looking down on what is taking place. Meanwhile the squabbling barber-surgeons have been relegated to a subservient role of sharpening the tools of dissection beneath the table.

Also richly symbolic is the depiction of the audience of about seventy to eighty people crowded around the dissection table, hanging from pillars, and peering through archways and windows. The onlookers are from all walks of life, as is evident from their costume, ranging from university dignitaries, professors, clerics, physicians, midwives, to the curious public. In accordance with Vesalius's pedagogical creed, students are assisting the anatomist with his work. The two figures in the foreground on each side of the table are given special prominence. It is possible that the figure on the left represents Wolfgang Herwart of Augsburg (b. 1514), while the man on the right, admonishing the barking dog, may be the Paduan philosopher, Marcantonio Genua (1491-1563); both men had encouraged Vesalius not to lose heart with his project during moments of doubt, and are hereby acknowledged. Another interpretation is that the latter figure represents Galen, who having never dissected a human body, is eagerly watching and learning. It has been sug-



gested that the bearded man on the right looking down from a balcony is the printer Johannes Oporinus. Much more interesting is the identification of the beardless head, seemingly suspended in space, immediately to the left of Vesalius, and looking over his shoulder, as the artist Jan Stefan van Calcar. The curiously naked figure holding on to a pillar to the left of the scene may represent surface anatomy, or he may be looking on in horror at the fate that awaits him. One student is reading a book with the initials "C.G.", signifying "Claudius Galenus", stamped on the cover. In contrast, another student holding a closed book points at the dissection suggesting that there is more to be learned from observation than from books. The monkey and the dog, obligatory victims at a public anatomy, await their turn to be dissected. They have also been interpreted as oblique references to Galen's reliance on animal anatomy.

At the top of the picture are the punning coat-of arms of the Wesel family ("three weasels courant"), flanked by the Lion of St. Mark representing the Republic of Venice. The ox's head on the entablature is the emblem of "*Il bò*," the popular student name for the *Hospitum bovis*, acquired by the University of Padua in 1539.

The title page to the *Fabrica* soon became the prototype for other representations of public anatomy lessons for over a century.

PORTRAIT

The portrait of Vesalius at the age of twenty-eight that appears at the end of the introductory matter, is said to be the only authentic representation of the anatomist. Dressed in the same rich garments as on the title page – a sure sign of his elevated status – he is engaged in the dissection of the flexor muscles of the fingers and their tendons of a large woman, undoubtedly the same woman that is being dissected on the title page.

On the table lies a variety of instruments, a candle, an ink-well and a sheet of paper – the same objects as on the title page. The text inscribed on the paper is from Chapter 43 of the *Fabrica*, describing the very procedure that Vesalius is performing. The edge of the table declares Vesalius's age as twenty-eight, and the year 1542 in roman numerals. On the reveal beneath the table top is the phrase "OCYUS IUCUNDE ET TUTO", paraphrased from Asclepiades by Celsus, meaning "swiftly, pleasantly and safely" which the Vesalius family adopted as its personal motto.

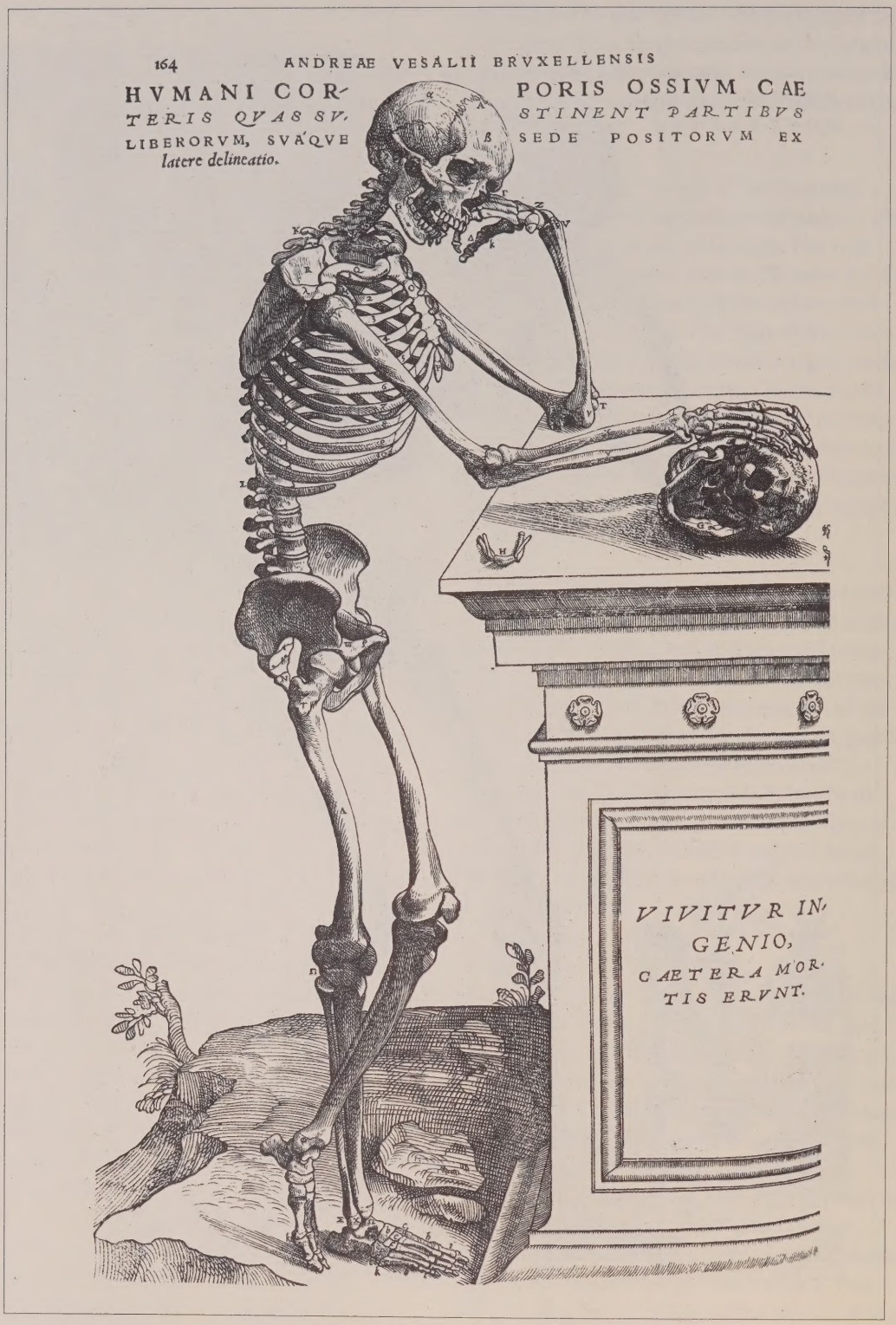
The seemingly disproportionate representation of Vesalius's body parts, in particular the large head and the short arms, has puzzled many commentators. Yet the fact that the portrait was also used both in the 1555 edition of the *Fabrica* and in the *China Root Letter*, suggests that it is an accurate representation of Vesalius's physical appearance. It has been speculated that Vesalius manifested signs of hypochondroplasia, a kind of short-limbed dwarfism, though he never made any reference to this condition.

THE ARTISTS

The identification of the artist or artists of the illustrations of the *Fabrica*, has confounded historians since the time of the book's publication. Many names have been put forward, but the most likely candidate is Jan Stefan van Calcar, who executed the three skeletal figures for Vesalius's *Tabulae anatomicae sex* in 1539. Those who challenge this attribution point to the fact that the skeletons in the *Tabulae anatomicae* are markedly inferior to the skeletal figures and muscle men of the *Fabrica*. This may be true, but working with a poorly articulated skeleton, the artist was merely drawing what he saw. Secondly, the inferior quality of the earlier plates may be due to the block-cutter's lack of technical skill. Unfortunately, Vesalius never acknowledged his artist, but at the end of the *Venesection Letter* of 1539, with his thoughts on a large anatomical work, he makes reference to Jan Stefan, "the distinguished contemporary artist", whom he hopes to engage in his grand venture. But any collaboration between anatomist and artist is always likely to be fraught with tension and difficulties, and there is the strong probability that Vesalius and Stefan fell out at some stage between the publication of the *Tabulae*

anatomicae and the *Fabrica*. Later in the *China Root Letter*, in a telling admission, Vesalius says that he no longer had "to put up with the bad temper of artists and cutters who made me more miserable than the bodies I was dissecting." By not acknowledging his artist, Vesalius was acting in a manner that was true to his complex character. Quick to take offence, and unable to forgive those who has offended him, Vesalius takes his revenge by remaining silent about his collaborators. The art critic Giorgio Vasari (1511-1574) in the second edition of his *Vite de piu eccelenti pittori* (1568), declares unequivocably that Jan Stefan was the artist of the *Fabrica*.

While evidence strongly points to the blocks being prepared in the Venetian workshop of Titian, some commentators have gone so far as to attribute the illustrations to Titian himself. Indeed, an edition of the *Fabrica* produced in 1706 by the Augsburg publisher Andreas Maschenbauer from the original woodblocks, confidently declares on its title page that the figures were designed by Titian. There are several objections to this attribution. Firstly, by the 1540s Titian was at the height of his powers, and his paintings were commanding huge sums. It is, therefore, extremely unlikely that he



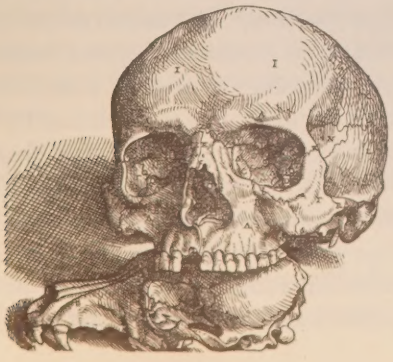
would take on such a utilitarian task as illustrating a book of anatomy. Secondly, if Vesalius could afford to hire such an eminent artist as Titian, whose collaboration would have added enormous prestige to the book, why was his name not mentioned in the *Fabrica*? It has even been suggested that the *Fabrica* was an elaborate plagiarism of the anatomical drawings of Leonardo da Vinci.

The identity of the artist may never be resolved, as new evidence is unlikely to become available. Stylistic analysis of the illustrations has produced nothing definitive. Vesalius was quite an accomplished artist, and may have done some of the smaller illustrations himself, though the larger illustrations were probably beyond his artistic capabilities. The most likely explanation is that Vesalius employed several artists and blockcutters, including Jan Stefan van Calcar. It is also likely that the best of the illustrations, the three skeletal figures and the fourteen muscle men, were drawn by Stefan, and transferred to woodblocks by a highly talented but unnamed blockcutter. Recent research has unearthed evidence suggesting that the blockcutters were Francesco Marcolini da Forli and one of his workmen, a German, Johann Britt.

THE ILLUSTRATIONS

In portraying the three skeletons, the artist succeeds in imbuing them with emotion, as they consider their mortal destiny.

The fourteen large ecorchés figures, the "muscle men," are unquestionably the outstanding artistic achievement of the *Fabrica*. The series is arranged sequentially to demonstrate a progressive dissection, layer by layer, beginning with surface of the whole body, and ending with a forlorn figure leaning against a wall, the remaining flesh hanging from his body. The figures may be divided into two categories: those in which the figures are represented as dead, supported by pulleys, ropes, and other devices, and those in which the figures appear to be alive and dynamic, flexing their muscles and moving under their own locomotion. Despite the naturalism of the figures, they represent an idealized human form that in reality does not exist. The artists invite the observer to enter their world through the application of the imagination.



The smaller woodcuts of individual parts do not represent the idealized body, but are particular to the cadaver being dissected, such as the illustration showing a human skull with a missing tooth, propped up by a dog's skull.

It was not until 1904 that it was realized that the rural backgrounds to the muscle men figures form a continuous panorama of the Euganean Hills along the river route from Padua to Venice – a journey that Vesalius made many times. Placed in a natural setting, strewn with ruins and other memento mori, the figures seem to inhabit a twilight zone between the living and the dead. The backgrounds are delineated with the same precision as the muscle men themselves. The use of landscape gives the image a sense of reality and perspective, and became a standard trope for anatomical illustration for the next few hundred years.

One of the most remarkable features of the *Fabrica* is the series of pictorial initial letters that introduce each book and chapter. This kind of embellishment had long been used in manuscripts as well as in printed books. The letters, which show the anatomist with his naked *putti* assistants engaged in various acts associated with his trade, provide glimpses of practical anatomy and surgery of the time. Care is taken to strike a harmonious balance between the form of the letter and the background scene, which enliven the text with a degree of macabre humour, and provide an ironic commentary on the activities of Vesalius. They serve as a kind of pictorial footnote.

The letters fall into two groups. There are four large initials – I O Q T – used at the beginning of each of the seven books into which the *Fabrica* is divided; and seventeen smaller letters at the head of each chapter.
Small L and O depict the body of an executed criminal being handed over to students under official supervision; an ecclesiastical figure holding a crucifix watches as *putti* remove the body of a female from the scaffold, while soldier guards stand by. Large O and I show a nocturnal disinterment.

SURVIVALS AND LOSSES

It has been estimated that between eight hundred and one thousand copies of the 1543 *Fabrica* were printed. In a census carried out in 1984, 154 copies had been located, though the actual number of surviving copies is probably greater. The largest concentration is in institutional libraries in the United States, with fifty-seven examples. The United Kingdom has twenty-six copies, Germany eight, the Netherlands six, and Canada four. A further thirty-one are spread across Europe, leaving twenty copies known from auction records, but whose whereabouts are unknown. Many copies have disappeared or have been destroyed over the centuries. Two copies once at the University of Leuven were destroyed by fire when the library was deliberately set alight by German troops in 1914. Another casualty of enemy action in Leuven occurred during the Second World War, when the woodblock of the title page to the 1555 edition of the *Fabrica* was destroyed. In the same war, books from the Leopoldina Library in Halle that had been buried in a mine for safe-keeping were plundered by Soviet troops, including a copy of the *Fabrica*. Another copy, once in the possession of the Belgian royal family, has also vanished.

One of the copies destroyed at Leuven in 1914 was for many years mistakenly thought to have been the dedication copy to Emperor Charles V. The real hand-coloured dedication copy was until recently owned by Dr Haskell Norman of San Francisco. It was sold at auction by Christies of New York on 18 March 1998, and is now in the possession of a private collector.

18 Andreas Vesalius. *De humani corporis fabrica librorum epitome*. Basel: J. Oporinus, 1543.

The *Epitome* was completed two weeks after the *Fabrica* on 13 August 1542, and was published in June 1543. It was dedicated to the Emperor's son, Philip II, the future King of Spain, on whose medical staff Vesalius would later serve.

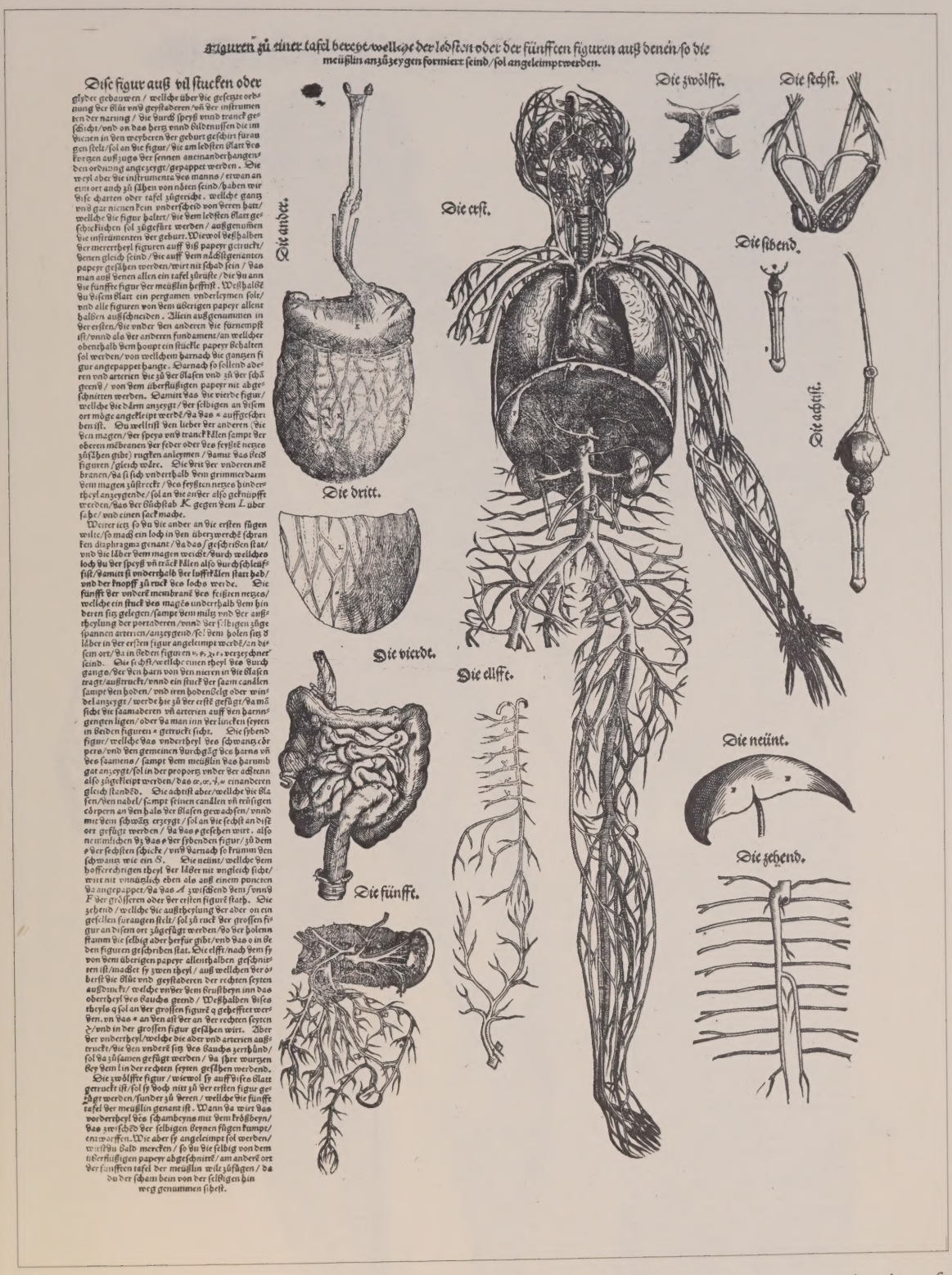
The *Epitome* was intended as a much condensed version of the *Fabrica*, for the use of students. Vesalius refers to it as a *semita* (gateway) to the *Fabrica*. The sheer bulk and price of the *Fabrica* make it clear that the book was not aimed at the student market, but rather at a wealthier class of reader, perhaps practicing physicians and teaching faculty. The *Epitome* was better suited to students' needs, as, in contrast to the *Fabrica*, it could be conveniently carried to lectures, and cost one-sixth of the price of the *Fabrica*.

Consisting of twelve folio leaves measuring 56 x 40 cm, the *Epitome* returns to the earlier model of the *Tabulae anatomicae sex*, where the illustrations take on greater significance than the text. The delineations of the distribution of the blood vessels, and the figure of a skeleton leaning against a tomb are the same as those used in the *Fabrica*, except for the removal of the epitaph "*vivitur ingenio, caetera mortis erunt*" (genius lives on, the rest is mortal) from the side of the tomb. The newly introduced "Adam and Eve" figures represent surface anatomy, with explanatory text describing external aspects of the body.
Other new illustrations display stages of the dissection of the brain. For the sake of economy, smaller anatomical parts are spread at the feet of the figures. The two illustrations displaying the blood vessels, nerves, and viscera, invite the reader to cut out certain anatomical parts from the leaf supplied, back them with thicker paper, and paste them upon the larger figure to form multi-layered manikins.

ON LOAN FROM DR EUGENE S. FLAMM

19 Andreas Vesalius. *Von des Menschen Cörpers Anatomey, ein kurtzer, aber vastnützer Asszug*. Basel: J. Oporinus, 1543.

Concerned about plagiarism and unauthorized copies in the German-speaking lands, Vesalius commissioned Alban Thorer (1489-1550), physician, professor, and Rector of the University of Basel, to produce a German version of the *Epitome*, using the original woodcuts, under his direction. It was published by Oporinus on 9 August, several days after Vesalius's departure from Switzerland. It is the only work of Vesalius to be translated into a vernacular language during his lifetime. The translation has more illustrations than the Latin version, and adds a second dedication, to Ulrich, Duke



of Württemberg (1487-1550). The text is set mainly in schwabacher type. The German translation is considerably rarer than the Latin version. Since the sheets were probably intended to be used as wall charts, full sets of the sheets are extremely rare, with only two copies recorded. Two incomplete copies are also known.

Thorer had translated a number of Byzantine Greek medical texts into Latin, and a treatise on the plague, an outbreak of which struck Basel in 1539. When Vesalius arrived in Basel in 1542, Thorer was engaged in preparing a Latin edition of Rhazes, based on a reexamination of earlier translations. Vesalius's *Paraphrase* of Rhazes was incorporated into Thorer's edition, which was published in Basel by Heinrich Petri in 1544.

Translation of scientific texts into German was especially difficult, as few German anatomical works existed, and consequently there was little in the way of a specialized anatomical vocabulary. Thorer had to coin new words, and many phrases required parenthetic explanations or paraphrase to make their meaning clear.

Der ausseren glideren des leybs/die on alle

Je wirt nit ein lengere erzelung der namē so die ausserē glider des menschens anzeigen/ fürgenum̄en/dann so vil wol beiseytz/vñ nebentsich am ort den bildnussen/ die alles wz außwendig an mans vnd weibsbild erscheynet/außdrucken/ bequemlichē mag angezeychnet werden. Wiewol das nit mehr dann ein kurtze beschreibung der selbigen geschehe/vñ nit anders dann eben als ein anzeygung der gegenwürdigen figuren fürzegeben/nichts verhindert. Die weil schier eben dise nam̄en den ausseren gliderē/vnd beinen/vnd auch disen stückenn so den ausseren orten vndworffen seind/zůgeeygnet werden/ Welcher wir die fürnemsten/ vnd die so von den recht wol verstendigē Anatomistē/auffgesetzt seind/ jetzt vor inn der beschreybung/ so vil der kurtz außzug hatt mögen erleyden/erzelt haben. Ist deßhalben ein gewonheit/das der gantz ausserlich leyb/vnnd alles das außwendig an jhm erscheynet/ vō den auffsetzern der selbigen nam̄en/erstlich iñ grosse stücke vñ glider zertheylt/vnd darnach widerumb der selbigen theilen kleineren stücklin mancherlei namen auffgelegt wirdt. Vnd also habē die Artzet iñ Egypto den Cörper inn dz haupt/brust/ bånd vnd schinbeyn getheylt. Nendtend aber die brust/ gleich wie auch Aristoteles/ den gantzen stam̄en des cörpers/ ales das von dem trossel/oder von dem hals oder dem nagel biß an die scham vñ der selbigen har/ oder mehr das sich biß auff die dicke der schenckelbeyn streckt/ vnd nitt allein/wie Galenus/vnd etliche andere fürnembsten Anatomisten sagen/ den leyb/ der mitt den rippen vmbgeben ist. Die anderen/ welche der stätten vnd glideren der vermügnuß vnd gewalts/ die ordenlichen den cörper außtheylen/ vñ der seelen oder gemůt war nemmen/ vnderscheyden vnd theylen auch den ausseren leyb gleich wie die Egyptij in vier theyl. Aber doch also/ das sie anderst dann dise/ den stam̄en/das ist den theyl von dē hals biß auff die schenckel/inn zwei stück vnd wonung erstlichen zertheylen/ Vnd iñ der selbigen ersten teylung/hånd vnd fůß für ein theyl zelen/ alle die so gelenck haben/ vnder dem namen der ausseren glideren/begreiffende/ vnnd machen inn dem stam̄en des cörpers zwen fürnemlich sitz/ nach den zweyen hülenen die da den Anatomicis begegnen/auß welchen der vnder/ von dem höherē netze das überzwerchs gaht gesündert/haltet iñ jm die leber/ein wonung der natürlichen vnd erneehrenden seel/ vnnd der blůtwerdung werchstatt/Vñ über das/die dem dienend instrumēta/die auch den glidern welche zů der geburt dienstlich/bereyt seind. Die ober hüle ist dem hertzen der zornlichen seel ein zundel/vnd des geysts des lebens brunnen/vnd denen so disen dienēd instrumenten/ zůgeben vnd verordnet. Weyter so wirt die dritt hüle des cörpers dem haupt zůgeeygnet/ vnnd dem hirnn/als der fürnembsten seel sitz zum mehrertheyl/ vnnd der sinnen vnd der bewegung geystsspeycher ergeben vnd geheyliget. So nun der leyb also im̄fürgang zertheylt ist/ so wirt eynes jegklichē theyls was oben außwendig an jm erscheynet/ widerumb auff ein news zerteylt/also das alles was vornen am gantzē kopff ob den augbrauwen on har begriffen ist/vnd ettliche linien/gleich wie furrhen an jhm hatt/die Styrn genant wirdt. Das nächst drob/ vnd das gegen

Arius. Extrema.

Frons.

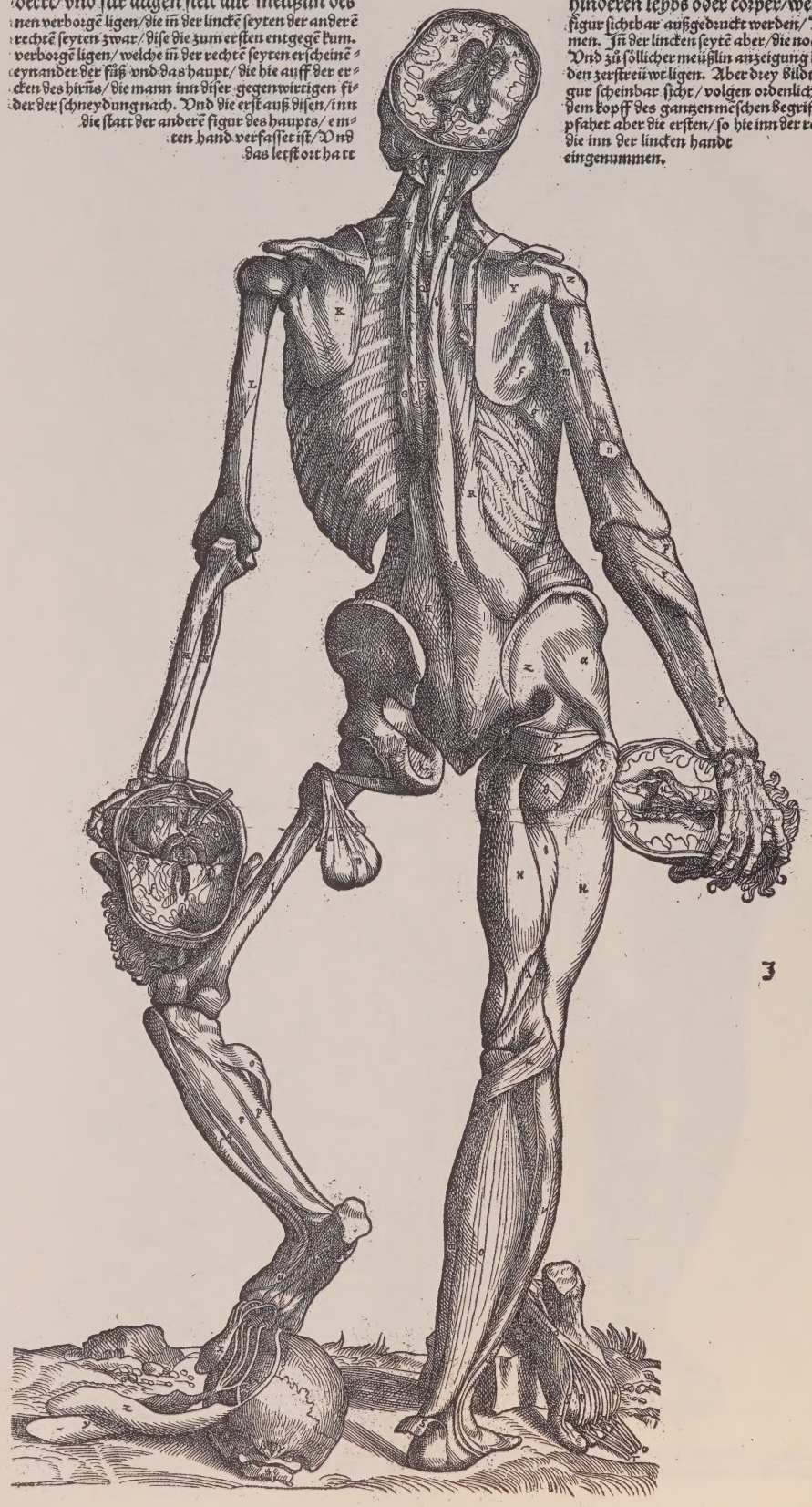
auffschneydung gesehen werden/nammen.

das gegen dem mittel theyl des haupts zůstreycht/ die Blassen vnd das vordertheil der hirnschalen. an beyden orten beyseyt/ oß den Ohren do der durchgang des gehörs ist/der Schlaff. Der mittel kopff oß der Blassen gegē dem hindertheyl/ die Scheyttel/ welches gleich wie ein mittel punctē des kreiß der des hars anfāg vmbscheydt/ vnd im circkel vmbfasset. Darnach hinder der scheyttel biß auff den vast weiten platz der meißlin/ welche auff beiden seyten zů oberst am hinderenn hals fürgehen/ vñ an mitten ein grůb anzeygt/ vnd von vilen Spaniaderen genent werden/ das hindertheyl des haupts/ oß der Nacke geheyssen wirt. Aber das vordertheil des haupts/ von der stirnen biß auff das kin herab/ Angesicht. Wann das vnder ort der stirnen/ wirt mit den Augbrāwen die da fürgan/ vnd mit dem har ebē als mit vmbsetztē marcksteynen/ vnd mit der beiden augbrauwen mitle vmbgezeünt/ vñ verschrancket. Vnder disen seind die Augen/ vnden vnd oben mit den augglidern bedeckt/ welches ort da sie vndereinander blintzē/ vnd mit auffgerichten vñ ordenlichen gesetzē (gleich wie wir die thůrer im schiff sehē) har/ die mā Augfederē nenet/ geziert/ vñ etlicher maß krößbeynig seind/ ligē die Tarsi. Diser fügē ende heyssen die winckel/ Welcher der gröss ser gegen d nasen/ d kleiner gegen dem schlaff lender. An mitten zwischē den offnē augglidrē on ßz fleischlin ßz in dē gröserē wickel sichtbar ist/ erscheinet das weiß im aug/ vnd in der mitte des selbigē weissēs seind zwen ring oder kreyß/ auß welchen der grösser der Regenbogen/ vnd die kron/ d mind der Augapffel genēt seindt. Die nasen ligt zwischen den augen/ welcher löcher Naßlöcher heyssen/ welcher die ausseren seyten der nasen auß fettichen oder flüglen/ die innertheyl aber auß dem krößbeynlin der nasen/ welches die zwey naßlöcher scheydet/ ordenlichen gemacht ist. Die gegne neben den seytten der nasen gehen vnd bausen rhotfarb wie ein apffel herfür/ heyssen die Wangen/ vñ von etlichen die Backen. Die stat zwischē der nasen vnd wangen/ nennen etlich Hölen oder öden/ Mit was nammen die anderen die ganze statt der augen/ von den augfederen biß auff die wangenn gemessen/ ehünd nennen. Das theyl des angesichts das wir auffblasen/ nennt man die Pfauß backen/ zů latein Bucca. Aber der ganz theil des angesichts von den augbrauwen biß auff die oberē zän/ wirt die Ober wange/ oder der ober backen genant. Das an der theyl aber/ das in den manen mit dem Bart geziert wirt/ die Vnder wang oder backen/ welches zů ausserst vornen an in das kin/ das etwan mit eynem grüble geziert ist/ harauß streckt/ vnder der rörte des vnderen Leffz begriffen. Das ober leffz vnderthalb der nasen gestelt/ vñ mit eyner furch oder canal begabt/ nent man den Knebel/ oß knebelbart. Was zwischē den leffzen begriffen ist/ heisset der Mūd. Wann der selbig auffginnt/ so sicht man die Zungen/ den Rachē/ die Gurglen/ die Zän/ das zanfleysch/ vnnd das inner ort des schlunds. Was zwischen dem haupt vnd den trosselbeinen oder brust stahet vñ begriffen ist/ heysset der Hals/ welches das vordertheil die Käl/ gleich wie das hindertheil der Hinder hals/ oder Genick. Die Achsel habē die alten gasgelenck des armbeyns mit dem schulderblat genent. Dannenhar sie auch die gegne oder das glid das

Sinciput.
Aures.
Meatus auditorius.
Vertex.
Tendines.
Occiput.
Facies.
Supercilia.
Blesophrynum.
Oculi.
Palpebræ.
Cilia.
Tarsi.
Anguli.
Albugo.
Iris.
Pupilla.
Nasus.
Nares.
Ale.
Interseptum.
Malæ.
Genæ.
Concauæ.
Glenæ.
Bucca.
Superior maxilla.
Barba.
Inferior maxilla.
Mentum.
Foueæ.
Labrū inferius.
Sulculus.
Mystax.
Lingua.
Palatum.
Gargareon.
Dentes.
Gingiuæ.
Fauces.
Collum.
Guttur.
Cervix.
Humerus.

Die vierdt figur/ auß denen so die meüßlin anzeygen/ entdeckt/ vnd für augen stelt alle meüßlin des menschen verborgē ligen/ die in der linckē seyten der anderē rechtē seyten zwar/ diser die zum ersten entgegē kum. verborgē ligen/ welche in der rechtē seyten erscheinē eynander der fäß vnd das haupt/ die hie auff der ercken des hirns/ die mann inn diser gegenwirtigen figur der schneydung nach. Vnd die erst auß disen/ inn die statt der anderē figur des haupts/ emten hand verfasset ist/ Vnd das letst ort hat

hinderen leybs oder cörper/ welche vnder der figur sichtbar außgedruckt werden/ Vnd hie an dernen. Jn der lincken seytē aber/ die noch vnder denen Vnd zů söllicher meüßlin anzeigung helffen wol mit den zerstreüwt ligen. Aber drey bildtnussen der figur scheinbar sicht/ volgen ordenlich durcheynander dem kopff des gantzen meschen begriffen/ kumpt an pfaher aber die ersten/ so hie inn der rechdie inn der lincken hande eingenummen.



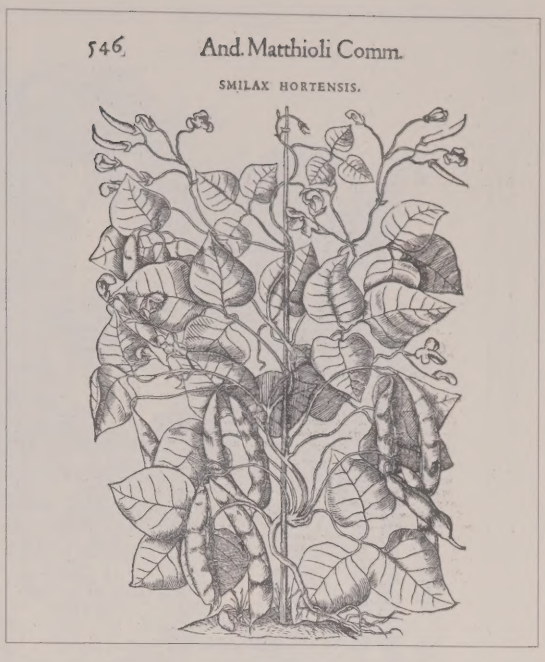
20 Andreas Vesalius. *Epistola rationem modumque propinandi radices Chynae dedocti.* Basel: J. Oporinus, 1546.

In 1546 Vesalius travelled to Ratisbon. On his arrival a letter from his friend Joachim Roelants, a physician of Mechlin, was awaiting him, asking for his opinion about the preparation, use, and therapeutic value of the root of the *China smilax*. China root, a relative of sarsaparilla, had recently become popular as a replacement for guaiac wood - a medication employed in the treatment of muscle pain and gout. In his reply Vesalius claimed little knowledge of the root. He had tried it to treat the Emperor's gout, but only with limited effectiveness. He concluded that he saw no reason to replace guaiac wood with China root.

Earlier, Vesalius had interceded on behalf of Roelants's son who had gone to Paris to study medicine. Vesalius wrote to several professors at Paris, including his old teacher Sylvius. In his letter Vesalius asked Sylvius in passing his opinion about the *Fabrica*. Sylvius admitted that while there was much merit in the *Fabrica*, he regretted that Vesalius had not treated Galen with more respect. He attributed Vesalius's manner to his youth and the negative influence of those Italians opposed to Galen. What offended Sylvius most of all was Vesalius's statement that Galen had never dissected human bodies. He ended the letter with an ultimatum, that unless Vesalius withdrew his "false statements" regarding Galen, he would no longer be able to remain on amicable terms.

Sylvius's accusations and ultimatum provoked a belligerent response from Vesalius. Word of the letter reached Roelants who asked Vesalius what he had written to Sylvius. Vesalius had not kept a copy of the letter, but remembered the contents. He penned a lengthy reply to Roelants, explaining what had passed between him and his old teacher. The letter was intended to be a private communication to Roelants, but as copies of it were beginning to circulate, Vesalius's brother Franciscus, who was studying medicine at Ferrara, took it on himself to have the letter published in Basel by Oporinus, in order to forestall unauthorized versions. On hearing about his brother's intentions, Vesalius rewrote the original letter and sent it to his brother along with instructions to Oporinus on printing requirements. The letter was published in 1546 under the title *Epistola rationem modumque propinandi radices Chynae dedocti.*

The short discussion on the China root occupies only about one-tenth of the letter, the rest is taken up with Vesalius's defence of the *Fabrica* against the attacks of the Galenists. Vesalius railed against the conservative forces he encountered during his years in Paris that had stifled the pursuit of scientific enquiry. Mentioning Sylvius by name, Vesalius repeats his assertion that traditional authority must yield to the evidence of the senses, particularly in the case of Galen who, claimed Vesalius, had probably never performed a human dissection, having based his anatomical knowledge on the dissection of monkeys, not humans.



A variety of the smilax plant. P.A. Mattioli. *Commentarii in sex libros Pedacii Dioscoridis Anazarbei de medica materia.* Venice: Ex officio Valgrisiana, 1565

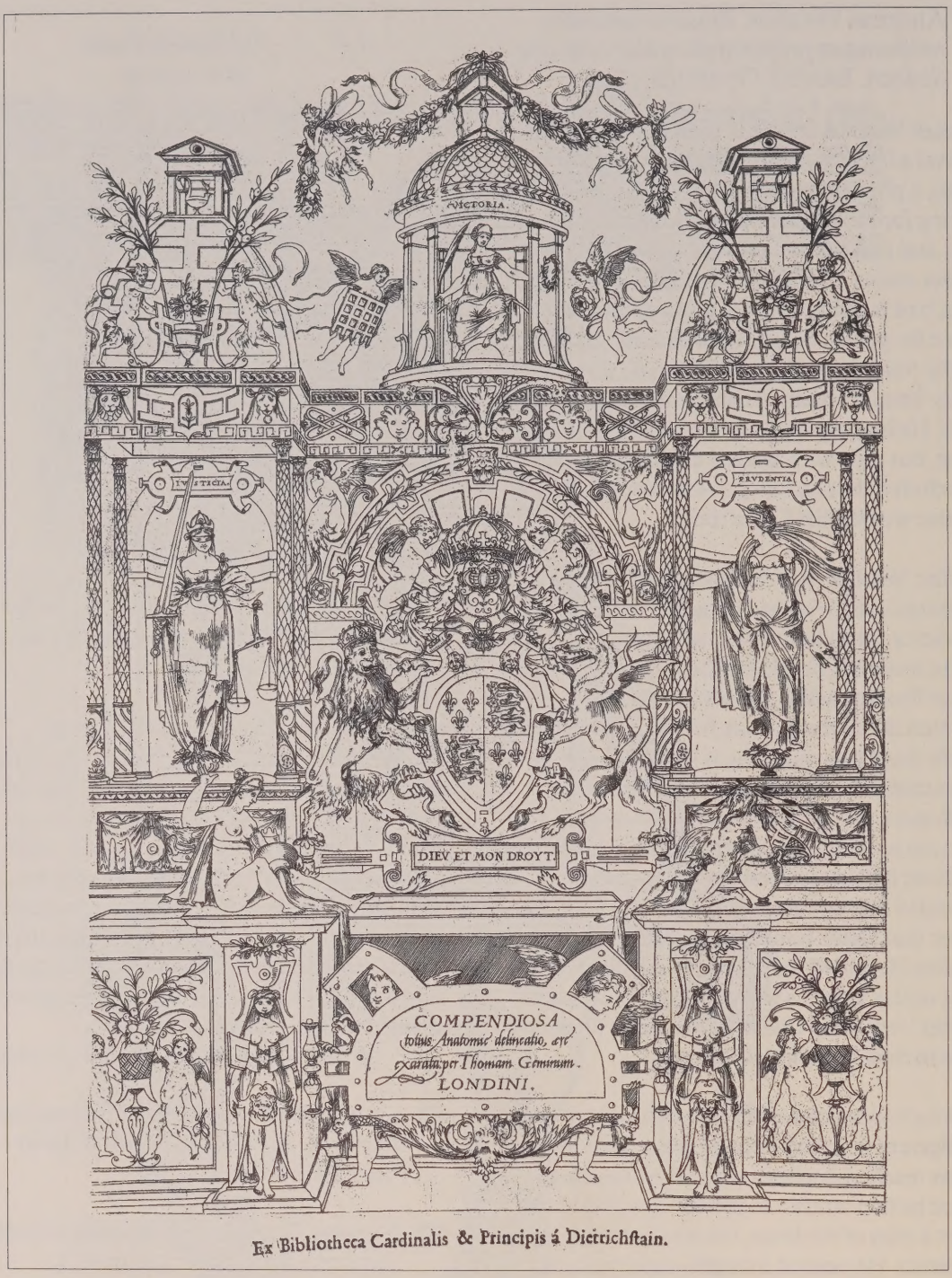
ON LOAN FROM DR EUGENE S. FLAMM

21 Thomas Geminus. *Compendiosa totius anatomie delineatio.* London: John Herford, 1545.

22 Thomas Geminus. *Compendiosa totius anatomie delineatio.* London: T. Geminus, 1559.

The first unauthorized reproductions of the plates of the *Fabrica* were done by Thomas Lambrechts, better known by the name of Thomas Geminus (d. 1562). Engraver, printer, and scientific instrument maker, Geminus was a native of Lixhe in the principality of Liège in Flanders, and may have arrived in England around 1524 as a refugee from religious persecution. In 1545 he issued the *Compendiosa totius anatomie delineatio*, which translated the woodcut illustrations of the *Fabrica* and the *Epitome* into copperplate engravings, which were accompanied by the Latin text of the *Epitome*.

Publication of the *Compendiosa* so enraged



Ex Bibliotheca Cardinalis & Principis á Dietrichſtain.

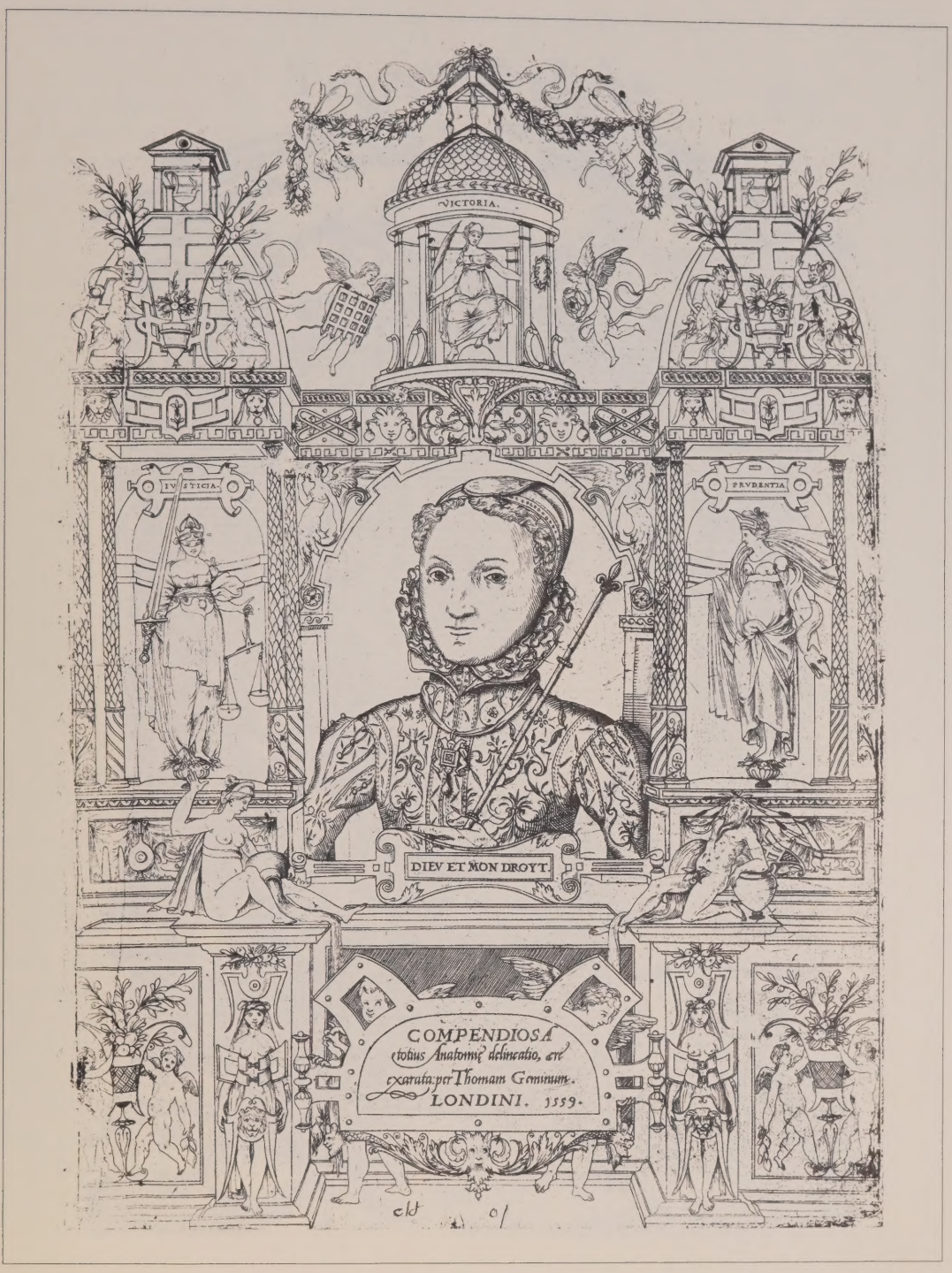
Vesalius, that in the *China Root Letter* he wrote:

> Just now in England ... the illustrations of my *Epitome* have been copied so poorly and without artistic skill ... that I should be ashamed if anyone were to believe me responsible for them ... Everything has been shamefully reduced, although figures of this sort can never be exhibited large enough ... I should much prefer to provide printers with the illustrations than have them copied unskillfully ... with the favour of the gods, I shall spare no efforts to vanquish those plagiarists who are wont to seize upon the labours of others since they are unable to steal anything original from one another

But in fact, far from ignoring Vesalius, Geminus gives high praise to the author of the *Fabrica* in his introduction:

> In my delineation of the whole body according to its parts, I have followed Andreas Vesalius of Brussels, who is by far the most skilled man of our times in this art. I have followed him and, if I am not mistaken, have kept pace with him, but by a short cut. For what he produced at great length in many verbose books, I, in so far as I was able, collected into a kind of compendium, engraved by me on copper and published for the general use of students

The *Compendiosa* was dedicated to Henry VIII. As Geminus informs us, he had been commanded by the King, who wished to improve the practice of surgery in England, to issue a new edition of the *Fabrica*.



In addition to their engraved title pages, each edition of the *Compendiosa* contained forty-one pages of engravings printed from fifty plates, including all the large plates from the *Fabrica*, most of the important smaller plates, and the Adam and Eve figures from the *Epitome*. In some instances the figures are reversed, as is all the lettering. The background to the muscle men figures has been removed, and replaced with tufts of grass and small stones.

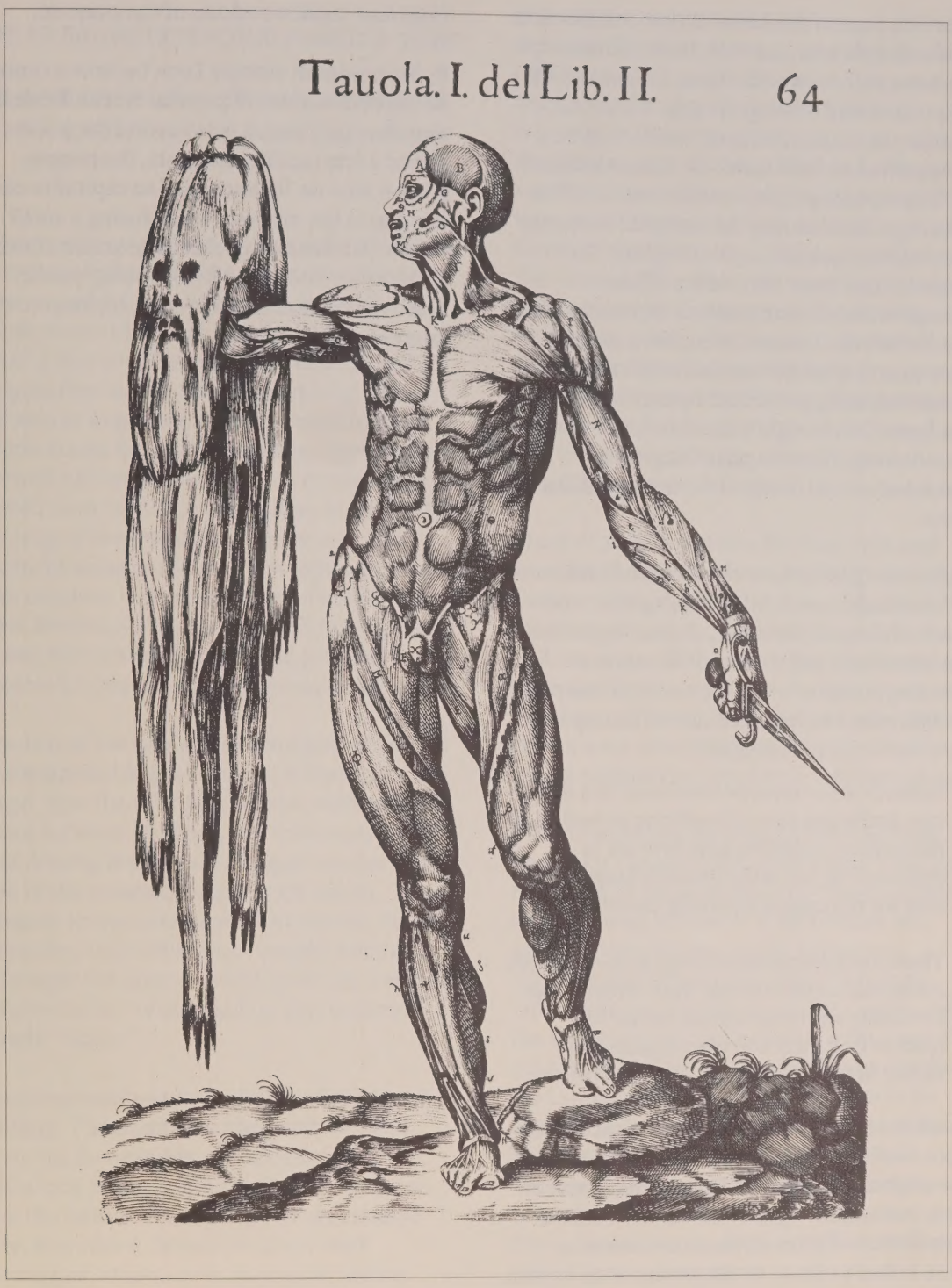
Sales of the *Compendiosa* appeared to have gone well in England especially as its production was underwritten by the monarch. But perhaps mindful of the fact that the surgeons and barbers of England were considered to be inferior to the university-trained physicians, Geminus decided that an English version of the *Compendiosa* would be of benefit to those who were performing surgery but who had no Latin. Accordingly, in 1553 he produced an English version. The plates remained the same, but the captions accompanying were translated into English by Nicholas Udall (1505-1556), poet, playwright, and translator of Erasmus. Although the title page retains the Latin title of the original, the work was given a new text with the caption title *A Treatyse of Anatomie wherin is conteyned a Compendious or Briefe Rehersal of al and singular the Partes of Mans Body*, which was compiled from several earlier works. There are close resemblances between this text provided by Geminus and Thomas Vicary's *Anatomie of Mans Bodie*, first published in 1548, no copies of which have survived; a second edition appeared in 1577 which allows a

comparison with the text of the *Compendiosa*. Vicary's work was itself a compilation gleaned from a late fourteenth-century manuscript based on the writings of Henri de Mondeville and Guy de Chauliac. In 1559 Geminus published a second English version, a reprint of the 1553 edition. Each version of the *Compendiosa* was dedicated to a different monarch – Henry VIII, Edward VI, and Elizabeth. The 1545 edition has the distinction of being the first book in England to have an engraved title page. The title page of the 1559 edition features a portrait of Elizabeth which is thought to be the first depiction of the newly crowned queen following her accession to the throne.

1545 EDITION ON LOAN FROM DR EUGENE S. FLAMM

23 Juan de Valverde de Amusco (circa 1525-circa 1588). *Anatomia del corpo humano.* Rome: Ant. Salamanca, &Antonio Lafreri, 1560.

Another so-called "plagiarism" appeared in Rome in 1556. The work, written in Spanish by Juan Valverde de Amusco (circa 1525-circa 1588), was entitled *Historia de la composicion del cuerpo humano*. The book proved to be very popular and was translated into Italian six times between 1559 and 1682, into Latin four times, and twice into Dutch. Two of the Latin (1566 and 1572), and one of the Dutch editions (1568), printed in Antwerp by Christoph Plantin (circa 1520-1589), were unauthorized.



Valverde had studied medicine in Padua and Rome under Vesalius's rivals, Realdo Columbo and Bartolomeo Eustachi. Almost all of the book's forty-three plates were taken directly from the *Fabrica*; only four were original illustrations. Like Geminus, Valverde preferred the medium of engraving on copper. The designs were drawn by Gaspar Becerra (1520?-1568?), a contemporary of Michelangelo (1475-1564), and the engravings are thought to have been carried out by Niccolò Beatrici (1507?-1570?), whose monogram "NB" appears on several of the plates.

One of the most striking original plates is that of an ecorché figure holding up its own skin in one hand and a knife in the other. The image has been compared to Michelangelo's painting in the Sistine Chapel of Saint Bartholomew in the Last Judgment. Other illustrations, rich in mannerist excesses, include two figures holding their flayed bodies open; a dissected figure dissecting a cadaver; and a torso encased in armour displaying its abdominal organs. Valverde also made several alterations to the Vesalian originals, including the skeletons, the muscles of the eye, nose, and larynx. Moreover, although Valverde's text relied heavily on Vesalius's, he makes about sixty textual corrections and additions, mostly in the captions to the illustrations.

The title page of the Latin edition, published at Rome in 1560 with the title *Anatomia del corpo humano*, shows two skeletons supporting an elliptical shield bearing the title. Above are a monkey and a pig, frequently used in dissections, either as substitutes for human subjects, or for purposes of comparative anatomy. The title page also includes the standard memento mori of bones, skulls, and hour-glass. The scenes in the lower part reflect different moments from the anatomical demonstration. On the left the anatomist teaches a student how to articulate a skeleton. In the centre is a dissection being performed by teachers and students. On the right a dissection of a woman is underway. This title page design was reprinted several times with minor modifications.

Valverde regarded himself as a faithful follower of Vesalius by constantly stressing the importance of direct observation, the leading role of the anatomist, and the use of illustration. Vesalius, on the other hand, had little tolerance for Valverde, and regarded him as an imposter. Later he wrote to Falloppio:

> Valverde who never put his hand to a dissection and is ignorant of medicine as well as of the primary disciplines, undertook to expound our art in the Spanish language only for the sake of shameful profit ...
>
> There are innumerable things in the Spanish compendium of Valverde from which it can be readily seen that neither he nor his teacher Colombo was even superficially versed in the writings of Galen and others.

Vesalius argued that the copying of the illustrations from the *Fabrica* produced a distortion of the originals. Looked at from another point of view, it could be argued that Valverde's (and Geminus's) versions of Vesalius's anatomy, were in fact a tribute to the genius of its creator. Indirectly, through their efforts, the dissemination of Vesalius's ideas reached a wider audience. In this sense plagiarism may be seen as a form of homage to the original creator.

24 Andreas Vesalius. *De humani corporis fabrica, lib. VII.* Lyon: J. de Tournes, 1552. 2 volumes.

This two-volume unauthorized edition of the *Fabrica*, produced in Lyon in 1552 by Jean de Tournes, represents a different kind of plagiarism. Because the principal appeal of the *Fabrica* was in its illustrations, this edition is most unusual, in that it reproduces only the text of the *Fabrica*, and none of the illustrations, apart from four small woodcuts of the cranium.

In the sixteenth century Lyon became a centre for pirated editions of popular works. Realising that the 1543 *Fabrica* was beyond the pocket of all but a few wealthy students, the printer-scholar Jean de Tournes tried to capitalize on this gap in the market, by producing a small format (sixteenmo) pocket size version aimed at the lower end of the book-buying public. The two volumes stand in stark contrast to the impressive folio of 1543.

DE HUMANI CORPORIS FABRICA 1555

25 Andreas Vesalius. *De humani corporis fabrica libri septem.* Basel: J. Oporinus, 1555.

Copies of the 1543 *Fabrica* were still available in 1547 from Oporinus, who was probably reluctant to embark on printing a second edition, while sheets of the first edition remained unsold. But at some point between the end of August 1550 and October 1551, during a long sojourn in Augsburg, Vesalius began making preparations for a second edition. Type for the revised edition had been cast in moulds borrowed from Francisco de Enzinas, but after the printing of five books the type became too worn for subsequent use. New type was therefore required, but unfortunately Enzinas had died. Eventually Oporinus had the opportunity to buy the moulds outright and printing resumed. It was completed in August 1555.

The text of the new edition brought major typographical improvements. It was set in larger type than the 1543 edition, with more space between the lines, and fewer words per line. Among the textual changes was the deletion of the names of people with whom Vesalius had quarreled, such as Sylvius, Fuchs, Dryander, and Colombo, or people who had died since the original printing of 1543. Even the "divine Galen" of 1543 had by 1555 become simply "Galen."

Some material was revised in the light of new findings. The chapter dealing with the fetal covering, for example, was greatly improved, and a long passage refuting Galen's assertion that the intraventricular septum was permeable, was added. Several chapters were rearranged, while a new chapter on instruments was inserted. Reference to students illegally bringing bones home for study was dropped.

Most of the textual changes were purely stylistic and did not alter the overall meaning. In many cases a word or phrase has been exchanged for a more eloquent or accurate expression, thus demonstrating that Vesalius was as much concerned with verbal detail as with anatomical. Sentences were altered in various ways, such as the rearrangement of clauses, change of word order – all in an attempt to write a more elegant humanist Latin. There is a new index, and a long list of errata – strong evidence that Vesalius was not present in Basel during the printing.

Perhaps the most notable difference between the two editions is the woodcut title page. The 1555 title page is much inferior to the 1543, and clearly was not executed under Vesalius's supervision. The new title page is heavy and flat, the lines more coarse. The head of the anatomist has become enlarged, the number of rings on his fingers has been reduced to one. Gone are the plants and foliage growing out of the masonry. The folds and wrinkles of the garments have also disappeared. The nude figure holding on to the pillar is now fully clothed. One of the dogs has been replaced by a goat. The skeleton supported by a staff in the 1543 edition, now holds a scythe, transforming it into the grim reaper. Oporinus's name no longer appears in the imprint.

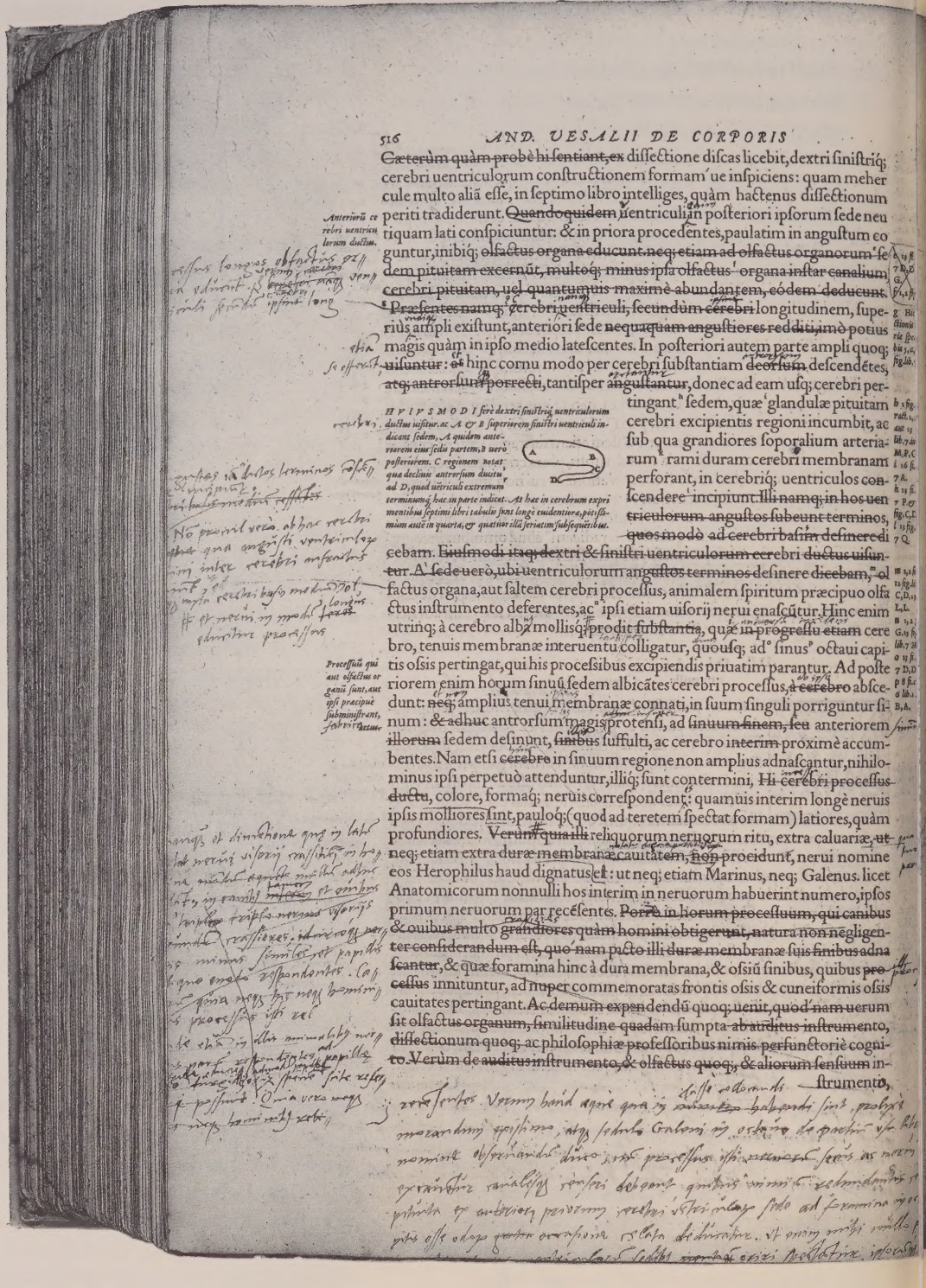
Many of the illustrations that had appeared crowded in the first edition, are now spaced further apart, and the accompanying text has been rearranged. Index letters that had been difficult or impossible to see have had some of the hatching removed to make them more visible. Several illustrations were removed, while others were extensively reworked, and still others replaced by completely different images.

The initial letters are substantially the same, except for the introduction of a large V for the beginning of the dedication to Charles V, and the beginning of book V. It differs from the other pictorial letters in that it depicts a mythological theme - the story of Marsyas, who challenges Apollo to a music contest, with the winner choosing a penalty for the loser. The contest is presided over by the Muses. Apollo is the victor and decrees that Marsyas is to be skinned alive. On the left of the image sit the Muses in judgment; on the right Apollo is about to flay Marsyas. This has been interpreted by some as an allegory of Vesalius flaying his Galenist adversaries. The small set of initials was redesigned.

VESALIUS'S OWN ANNOTATED COPY

The story behind the remarkable discovery of Vesalius's own annotated copy of the 1555 edition of the Fabrica is best told by its owner:

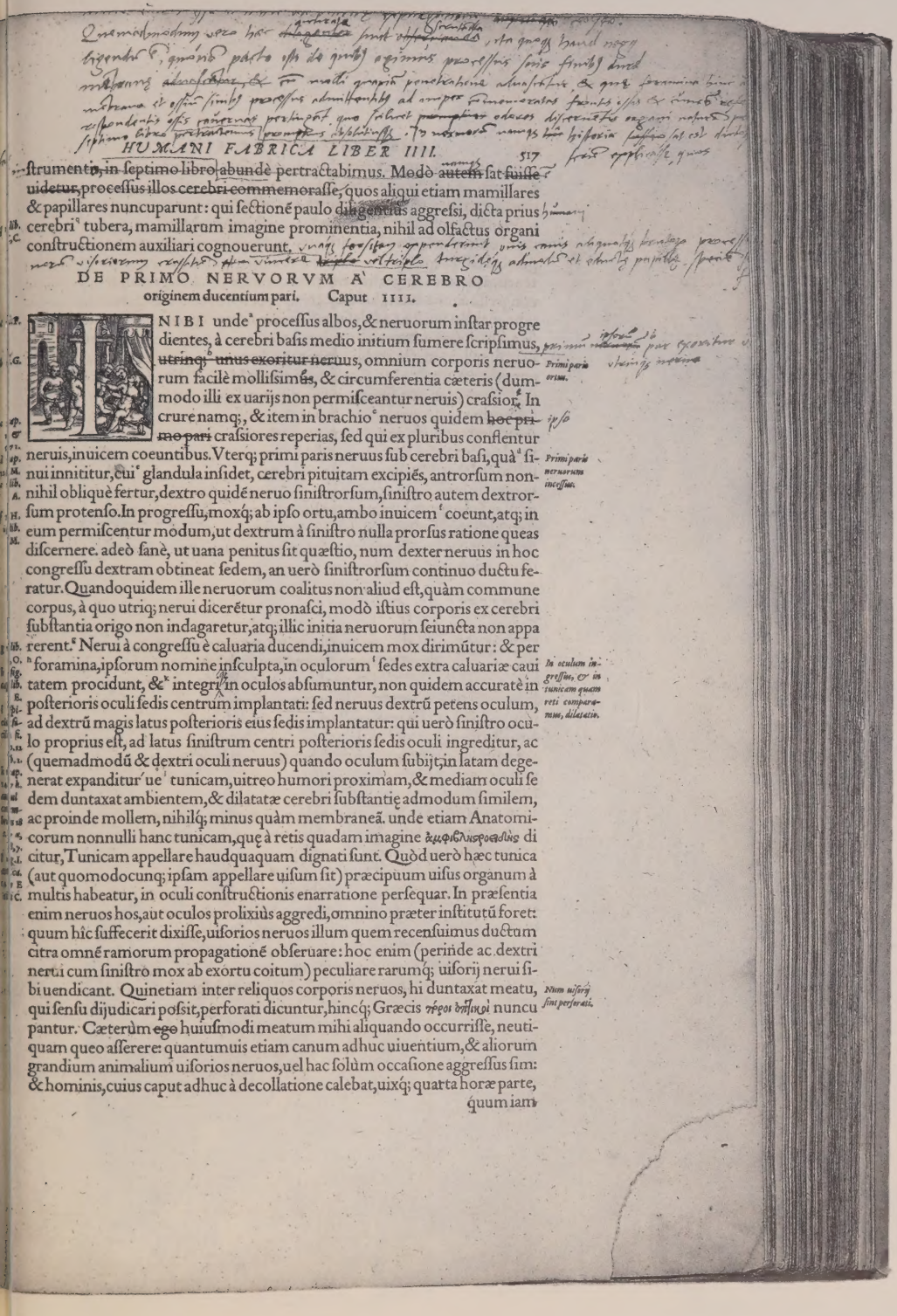
> I am sure that most serious collectors, whatever their field of interest, dream of discovering or acquiring one very special item. In the field of rare books in science and medicine, a copy of *De humani corporis fabrica* owned and extensively annotated by Andreas Vesalius is truly unique! That the annotations were most likely meant for a third edition of this book, which was never published, makes this discovery even more incredible and important.


516 AND. VESALII DE CORPORIS

As a collector of rare books, I have always been attracted to books with annotations. I am fascinated by the handwritten notes of past readers, some of them written hundreds of years ago. Who were they? Where were they when they wrote them? Why did they write them? Lastly, there is always the highly unlikely possibility that they were written by a significant figure, someone we would still know today.

I find it very fortunate that most collectors seem to view annotations as defects and put more value on non-annotated copies. This was certainly the case with the 1555 edition of *De humani corporis fabrica* that I purchased at auction in 2007. I am convinced that the extensive annotations throughout this particular copy made it unattractive to other collectors, and the book did not attract much attention at auction.

It was soon after I acquired the book that I began to examine it thoroughly. Initially, it was the extent of the annotations that intrigued me most. The 1555 edition of *De humani corporis fabrica* is a large folio of over 800 pages, and the annotations cropped up



HUMANI FABRICA LIBER IIII. 517

strumento, in septimo libro abundè pertractabimus. Modò autem sat fuisse uidetur, processus illos cerebri commemorasse, quos aliqui etiam mamillares & papillares nuncuparunt: qui sectionè paulo diligentius aggressi, dicta prius cerebri tubera, mamillarum imagine prominentia, nihil ad olfactus organi constructionem auxiliari cognouerunt.

DE PRIMO NERVORVM A CEREBRO originem ducentium pari. Caput IIII.

NIBI unde processus albos, & neruorum instar progredientes, à cerebri basis medio initium sumere scripsimus, utrinq; unus exoritur neruus, omnium corporis neruorum facilè mollissimus, & circumferentia cæteris (dummodo illi ex uarijs non permisceantur neruis) crassior. In crure namq;, & item in brachio neruos quidem hoc primo pari crassiores reperias, sed qui ex pluribus conflentur neruis, inuicem coeuntibus. Vterq; primi paris neruus sub cerebri basi, quà sinui innititur, cui glandula insidet, cerebri pituitam excipiens, antrorsum nonnihil obliquè fertur, dextro quidé neruo sinistrorsum, sinistro autem dextrorsum protenso. In progressu, moxq; ab ipso ortu, ambo inuicem coeunt, atq; in eum permiscentur modum, ut dextrum à sinistro nulla prorsus ratione queas discernere. adeò sanè, ut uana penitus sit quæstio, num dexter neruus in hoc congressu dextram obtineat sedem, an uerò sinistrorsum continuo ductu feratur. Quandoquidem ille neruorum coalitus non aliud est, quàm commune corpus, à quo utriq; nerui dicerẽtur pronasci, modò istius corporis ex cerebri substantia origo non indagaretur, atq; illic initia neruorum seiuncta non apparerent. Nerui à congressu è caluaria ducendi, inuicem mox dirimũtur: & per foramina, ipsorum nomine insculpta, in oculorum sedes extra caluariæ cauitatem procidunt, & integri in oculos absumuntur, non quidem accuratè in posterioris oculi sedis centrum implantati: sed neruus dextrũ petens oculum, ad dextrũ magis latus posterioris eius sedis implantatur: qui uerò sinistro oculo proprius est, ad latus sinistrum centri posterioris sedis oculi ingreditur, ac (quemadmodũ & dextri oculi neruus) quando oculum subijt, in latam degenerat expanditur ue tunicam, uitreo humori proximam, & mediam oculi sedem duntaxat ambientem, & dilatatæ cerebri substantię admodum similem, ac proinde mollem, nihilq; minus quàm membraneã. unde etiam Anatomicorum nonnulli hanc tunicam, quę à rẽtis quadam imagine ἀμφιβληστοειδὴς dicitur, Tunicam appellare haudquaquam dignati sunt. Quòd uerò hæc tunica (aut quomodocunq; ipsam appellare uisum sit) præcipuum uisus organum à multis habeatur, in oculi constructionis enarratione persequar. In præsentia enim neruos hos, aut oculos prolixiùs aggredi, omnino præter institutũ foret: quum hìc sufficerit dixisse, uisorios neruos illum quem recensuimus ductum citra omnẽ ramorum propagationẽ obseruare: hoc enim (perinde ac dextri nerui cum sinistro mox ab exortu coitum) peculiare rarumq; uisorij nerui sibi uendicant. Quinetiam inter reliquos corporis neruos, hi duntaxat meatu, qui sensu dijudicari possit, perforati dicuntur, hincq; Græcis πόροι ὀπτικοὶ nuncupantur. Cæterùm ego huiusmodi meatum mihi aliquando occurrisse, neutiquam queo asserere: quantumuis etiam canum adhuc uiuentium, & aliorum grandium animalium uisorios neruos, uel hac solùm occasione aggressus sim: & hominis, cuius caput adhuc à decollatione calebat, uixq; quarta horæ parte, quum iam

Primi paris ortus.

Primi paris neruorum incessus.

In oculum ingressus, & in tunicam quam retiformem comparamus, dilatatio.

Nim uisorij sint perforati.

throughout the book, from the beginning to almost the last page. I have many other annotated books in my collection, and none of them have as many annotations as this one.

I also found the nature of the annotations to be very unusual. In many cases sentences and even paragraphs had been crossed out and rewritten in the margin. On some pages, these marginal notes had also been crossed out and rewritten. Although I could not read them, I could see that they were written in Latin and it was clear that the annotator was rewriting sentences and paragraphs rather than making notes. In other annotated books I own, sentences are underlined and there are marginal notes, but nothing like the rewriting of paragraphs I was seeing here.

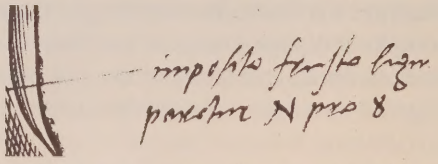
I could also see that this person had read the entire book very carefully. There were numerous corrections to the smallest details throughout the book… spelling errors, commas to periods, colons to semicolons. Not an easy task for such a large volume of difficult Latin reading. I also noticed that the

DECIMA-
TERTIA
TABVLA.

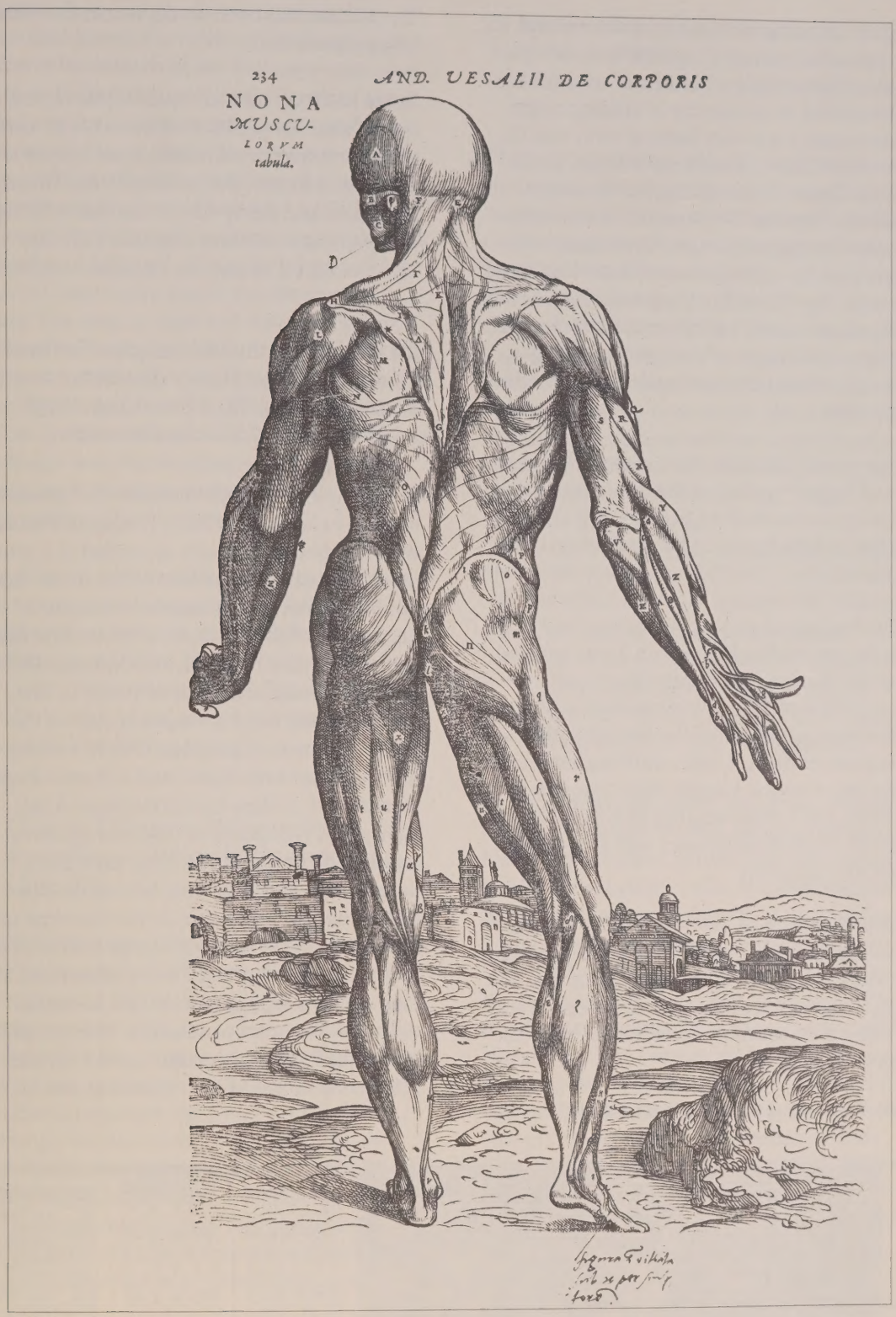
name of Vesalius' father, Andreas, was crossed out in the introduction… curious indeed!

These annotations were clearly not those of a typical student or casual reader, and to me, they raised the possibility that they were made by Vesalius himself. But how does one go about determining if the annotations were by really written by Vesalius?

An obvious place to start would be to compare the handwriting of the annotations with known specimens of Vesalius' hand-

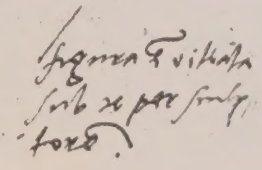


writing. Examples of handwriting by Vesalius are extremely rare, largely because he burned his early books and papers, as related in his book *Epistle on the China Root* published in 1546. There are fewer than ten known existing letters that had been written by Vesalius, but after an extensive search on the internet, I was able to get hold of excellent photocopies of two Vesalius letters from



the Waller Manuscript Collection at Uppsala University.

When I received the copies of these letters and compared them with the annotations, I had by far my most exciting experience ever as a collector. The handwriting of the annotations was absolutely identical to the handwriting in the letters. There was match after match… between words, letters, spacing, flourishes at the end of words… everything matched! I was then certain that this was an annotated copy of Vesalius' *De humani corporis fabrica* written by his own hand.



Even though I could neither read nor understand the annotations, I knew that this was a book of great significance and value, not just to collectors, but also to many others, including scholars and historians. What was Vesalius writing, and why? The annotations had to be translated.

It was clear to me that a discovery of such

great importance would require a world class scholar in medical history to interpret the contents, but who? I have always been interested in the history of medicine, and one name I was very familiar with was Dr. Vivian Nutton, Emeritus Professor at the UCL Center for the History of Medicine. When I emailed Dr. Nutton and told him what I thought I had, he responded with interest, but also cautioned that I should not be too hopeful that the annotations were by Vesalius himself. He requested that I send him some images of the annotated pages, and he would then get back to me with his opinion.

It was only after Dr. Nutton saw the images and began translating the annotations that he became as excited as I was. It was also clear to him, based on his translation of the annotations, that they could only have been written by Vesalius. This was confirmed by Dr. Nutton when he came to thoroughly examine the book in person. I was amazed at Dr. Nutton's talent after I received his transcript of the annotations and read his fantastic paper giving the first scholarly discussion of them. It was a thrilling experience for me to watch a world class historian at work, and I could see that he was at least as if not more thrilled than I was at this spectacular discovery.

Andreas Vesalius' own copy of *De humani corporis fabrica*... one of the most important books in history, extensively annotated by its own author, undiscovered for centuries. The word incredible doesn't even begin to describe it!

By Dr. Gerard Vogrincic MD, FRCPC

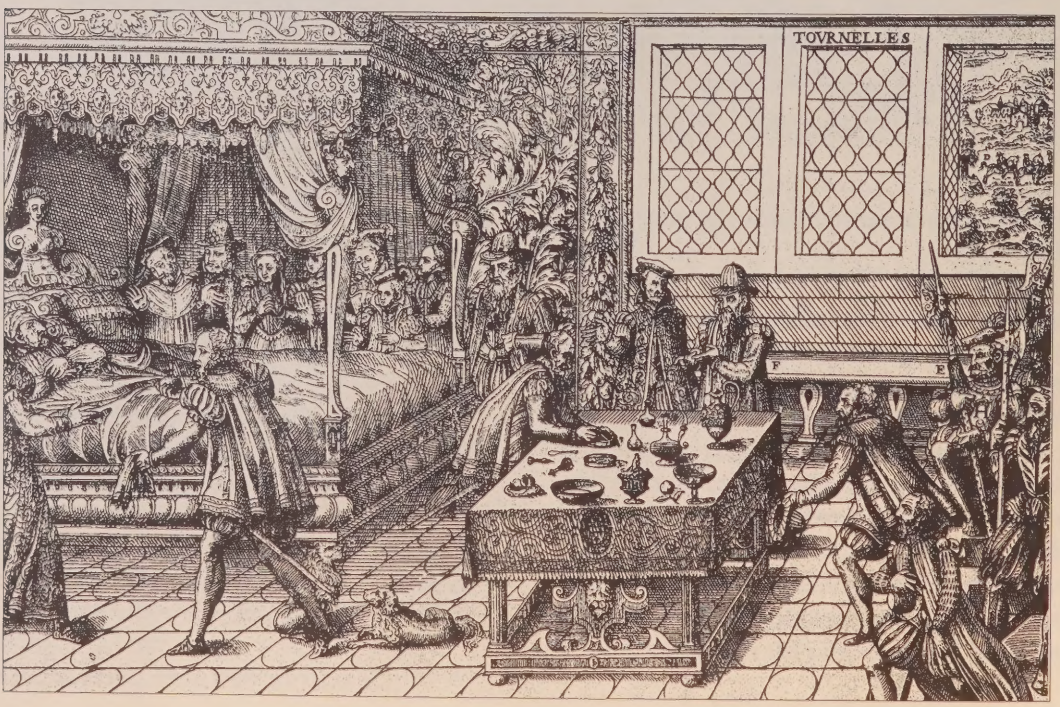
The volume has been on deposit at the Fisher Library since 2012.

There are 113 recorded copies of the second edition of the *Fabrica*. Most of them are in institutional or university libraries, with forty-five in the United States, thirty-three in the United Kingdom, and thirty-five in the rest of Europe. There are at least three copies in Canada.

ON LOAN FROM DR GERARD VOGRINCIC

26 Jean Perrissin and Jacques Tortorel "La mort du Roy Henry deuxieme aux tournelles a Paris le x iullet. 1559". [Geneva: J. de Laon, circa 1570.]

In the summer of 1559 Vesalius was summoned to Paris to attend to Henry II, King of France, who had been grievously wounded in a tournament. The contest was part of the three-day double wedding celebrations in honour of Emmanuel Philibert, Duke of Savoy, and Marguerite, sister of Henry II, and between Philip II and Marguerite, daughter of Henry II. The weddings had been arranged as part of the Peace of Cateau-Cambrésis of 1559, ending hostilities between Spain and a Franco-Papal alliance. On 30 June a joust between King Henry and Gabriel, comte de Montgomery, seigneur de Lorges (1530-1574) took place, despite dire warnings from Michel de Nostradamus (1503-1566) about the outcome of the contest. In the ensuing exchange a piece of de Montgomery's shattered lance penetrated the king's visor and lodged itself just above his right eye. The royal physicians, who included Ambroise Paré, managed to extract several splinters from the king's eye socket, but Henry



fell into a fever watched over by an anxious court that feared the worst. As the king's condition deteriorated, all medical measures were tried, including thrusts into the heads of executed criminals in an attempt to determine whether the lance might have penetrated the brain. With further medical consultation urgently required, word was sent to Philip II to dispatch Vesalius to Paris immediately. Vesalius arrived on 3 July, and after examining the king, realized that Henry would not survive the injury. The king, in pain and delirious, lingered on another week. On 10 July at 1 o'clock in the afternoon, at the age of forty, and in the twelfth year of his reign, Henry II, King of France, died. A post-mortem examination was conducted on the king's body by Vesalius, who determined the cause of death as cerebral compression with subdural haemorrhage.

The dramatic death of Henry II is captured in this woodcut by Jacques Tortorel, after the design of Jean Perrissin. Around the King's deathbed is gathered a host of dignitaries. In the centre of the scene are the figures of Vesalius and Ambroise Paré standing side by side, with Vesalius on the left.

27 Gabriel Falloppio. *Observationes anatomicae.* Venice: Marc Antonio Ulm, 1561.

Gabriel Falloppio (1523?-1562) of Modena became the chair of anatomy at the University of Pisa in 1548, before assuming Vesalius's former position at Padua in 1551. In Padua he succeeded in restoring some of the medical faculty's former prestige that had been lost since Vesalius's departure eight years earlier. Although the two men never met, Falloppio held Vesalius in high esteem, referring to him as "the prince of anatomists, an admirable physician, and a divine teacher." He considered himself Vesalius's disciple, and confessed to using the *Fabrica* as the basic guide for his own research.

Reputed to be an excellent anatomist and researcher, Falloppio published only one book during his lifetime: *Observationes anatomicae*, published at Venice in 1561. Other works published posthumously under his name, are probably spurious. In *Observationes anatomicae*, Falloppio gave notice of his plan to write a comprehensive and illustrated work on human and comparative anatomy, but it was never published.

ON LOAN FROM
OSLER LIBRARY, MCGILL UNIVERSITY

28 Andreas Vesalius. *Anatomicarum Gabrielis Falloppii Observationum examen.* Venice: Francisco de Franciscis, 1564.

The purpose of *Observationes anatomicae* was to correct some of the errors contained in the *Fabrica*, and to present new anatomical material in the cause of research. A copy was sent to Vesalius, who acknowledged receipt of the gift in a letter that he gave to Paolo Tiepolo, Venetian ambassador to Philip II, to convey to Falloppio. But as Tiepolo was delayed for several months in Spain, by the time he reached Venice, Falloppio was already dead. Three years later Vesalius's letter was published in Venice as *Anatomicarum Gabrielis Falloppii Observationum examen*, by which time Vesalius, too, was dead.

ON LOAN FROM DR EUGENE S. FLAMM

29 Andreas Vesalius. *Opera omnia anatomica & chirurgica;* cura Hermanni Boerhaave ... & Bernhardi Siegfried Albini. Leiden: J. du Vivie, et J. & H. Verbeek, 1725. 2 volumes.

One hundred and eighty-two years after the death of Vesalius, the first collected edition of his works appeared in two large folio volumes, published at Leiden, under the editorial guidance of Hermann Boerhaave (1668-1738), and Bernard Siegfried Albinus (1697-1770), two of the leading lights of the University of Leiden in the eighteenth century. The collection omits the *Tabulae anatomicae sex*, the *Paraphrasis* of Rhazes, and the *Venesection Letter*, but includes the spurious *Chirurgia magna*. It also includes two other works not written by Vesalius - Falloppio's *Observationes anatomicae*, and the *Apologiae Francisci Putei pro Galeno in anatome, examen*, which the editors believed was written by Vesalius under the pseudonym of Gabriel Cuneus.

The survival of the original woodblocks of the first and second editions of the *Fabrica* (see below) was unknown to the editors, who employed the great Dutch artist Jan Wandelaar (1690-1759) to copy the illustrations and have them engraved in copper. Wandelaar was a master of scientific illustration and was responsible for the plates of several anatomical works by Albinus, including his spectacular *Tabulae sceleti et musculorum corporis humani*, published at Leiden in 1742. Wandelaar also did the botanical plates for Carl von Linné's *Hortus Cliffortianus* in 1738.

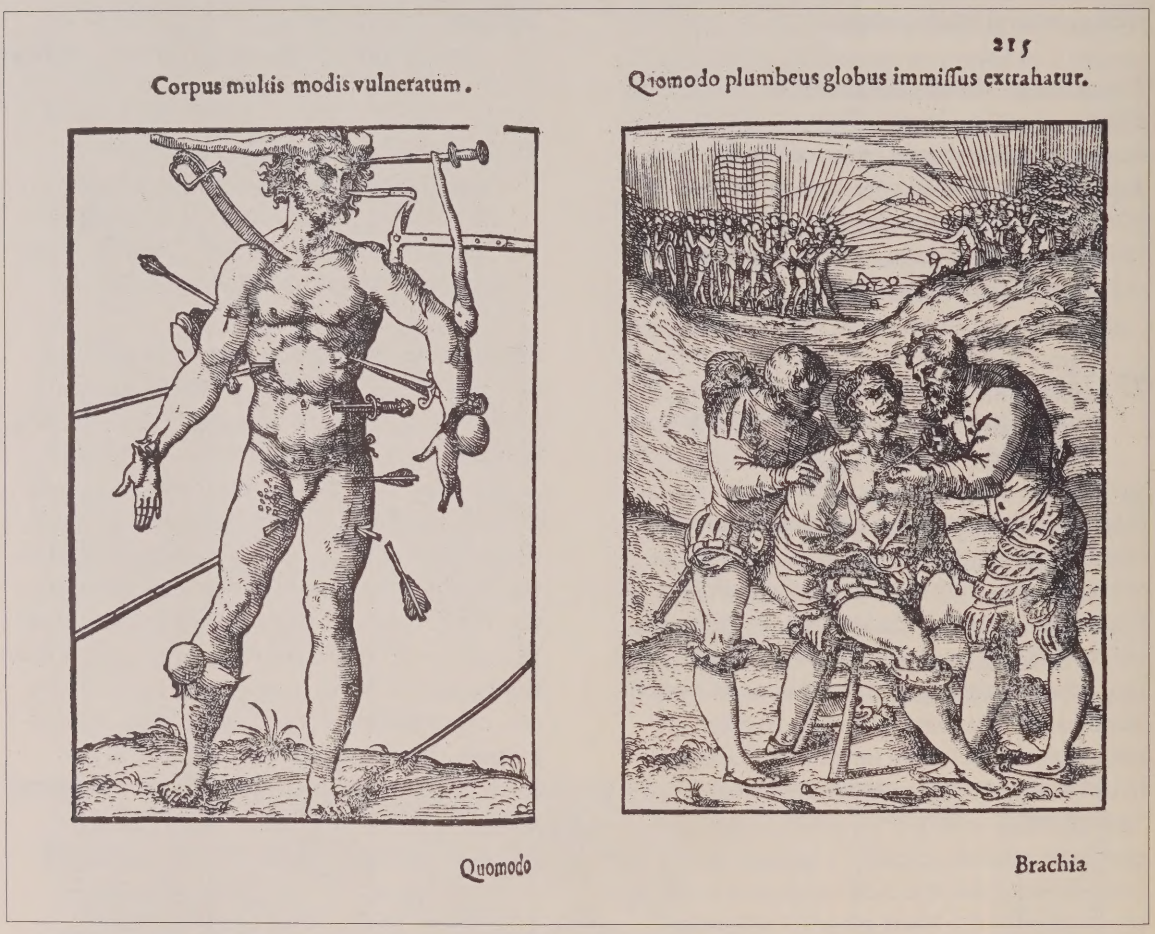
Capital for the production of this edition was

raised by subscription. According to the subscription list there were 209 copies ordered by 180 individuals and institutions. Assuming that extra copies were printed for the regular book market, an estimated print run of 250-300 copies is probable. The Fisher Library has two copies.

30 [Prospero Borgarucci]. *Andreae Vessalii Bruxellensis Chirurgia magna in septem libros digesta.* Venice: Vincenzo Valgrisi, 1568.

In addition to the numerous plagiarisms and unauthorized copying of the Vesalian illustrations, other unscrupulous operators took advantage of Vesalius's reputation. In 1568 there appeared in Venice under his name an octavo volume of over five hundred pages with the title *Chirurgia magna*, allegedly edited by Prospero Borgarucci, professor of the University of Padua. Borgarucci claimed to have discovered the manuscript in 1567 in Paris. There were two issues of *Chirurgia magna* published the same year, the first with a dedication of thirty pages, is dated September 1568, the second with the dedication reduced to four pages, is dated October; the latter issue suppressed the claim concerning the discovery of the manuscript. Three further editions came in 1569. The text was accompanied by three woodcut illustrations copied from *De chirurgica institutione*, written by Jean Tagault (d. 1545), and published by the same printer, Vincenzo Valgrisi, in 1544. Tagault's illustrations were poor renditions of the skeletal figures from the *Tabulae anatomicae sex*, while a fourth skeleton was lifted from the *Fabrica*.

There is little doubt that, though feasible, this collection of surgical notes is spurious. After all, Vesalius had taught surgery at Padua and had acquired valuable practical experience as a field surgeon in the service of Charles V, and during the last twenty years of his life had been regularly consulted on surgical matters. Moreover, in Book IV of the *Fabrica* Vesalius had expressed the intention of writing a book on surgery. But in trying to pass off the work as Vesalius's, Borgarucci erred by including quotations from books that were published after the death of Vesalius. Despite the obvious lack of authentication, *Chirurgia magna* was included in the 1724 Leiden *Opera omnia* edited by Boerhaave and Albinus.



ON LOAN FROM DR GERARD VOGRINCIC

31 Andreas Vesalius. *Icones anatomicae.* Ediderunt Academia medicinae novaeboracensis et Bibliotheca Universitatis monacensis. Munich: Bremer Presse, 1934.

Following the publication of the 1555 edition of the *Fabrica*, the woodblocks used to produce the illustrations, remained in the possession of Oporinus. According to Felix Platter (1536-1614) they were offered for sale in Basel in 1583. Platter himself had considered buying the blocks to illustrate his anatomical treatise *De corporis humani structura et usu*, printed by Froben at Basel in 1583, but decided against the purchase, as the inclusion of the woodblock illustrations would have made his book inconveniently large for his students. Instead Platter chose to illustrate his book with engraved plates reduced in size. It is likely that the woodblocks were purchased by Ambrose Froben, and that they remained in the possession of the family until 1603 when the firm went out of business. The whereabouts of the blocks during the seventeenth century is unknown, but they resurfaced in Augsburg at the beginning of the eighteenth century, when the printer/publisher Andreas Maschenbauer used them for abridged versions of the *Fabrica,* in 1706 and again in 1723, in which he attributes the drawing of the blocks to Titian.

The blocks remained in Augsburg until about 1770, when the physician Johann Anton von Woltter (1711-1778) rediscovered them, and took them to Ingolstadt. His intention was to include the woodcut illustrations in a larger work in German for the benefit of Bavarian surgeons, but ill health forced him to hand the task over to the anatomist and surgeon Heinrich Palmaz von Leveling (1742-1798), who had them printed in Ingolstadt in 1781 and again in 1783.

After Leveling's death the blocks were in all likelihood deposited in the University of Ingolstadt and, in the wake of the French invasion of 1800, were transferred to the University of Landshut. In 1826 they were again relocated, this time to the University of Munich, where they disappeared from sight until 1893, when 159 of the blocks were once more rediscovered in a cupboard in the University Library. The surviving blocks were examined and listed in 1895 by Professor Moritz Roth of Basel, Vesalius's first biographer. For the next thirty-odd years they were again forgotten, until 1932 when Dr S.W. Lambert of New York wanted to make a study on the ornamental initials. A search was undertaken, and although the initial letters were not found, the large blocks, which had been stored separately, unexpectedly turned up. Of the 227 original woodblocks, fifty had perished, including the eighth muscle man, the portrait of Vesalius, thirty-nine of the smaller blocks, as well as the initial ornamental letters. In 1934 the New York Academy of Medicine, in collaboration with the University of Munich, commissioned Dr Willy Wiegand of the Bremer Presse of Munich to produce a deluxe edition from the surviving blocks of the *Fabrica* and the *Epitome*, using a modern handpress. The new book, which excluded the text of the *Fabrica*, was given the title *Icones anatomicae*. The missing plates were reproduced in collotype. The title page of the 1551 edition of *Fabrica* was not among the blocks discovered at Munich, but was traced to the Library of the University of Leuven. The collotype illustrations lack the three-dimensional quality of impressions taken from the original blocks, which because of considerable improvements in printing techniques since the sixteenth century, could at last be seen in all their glory. This is evident when one compares the eighth muscle man, reproduced from a photographic impression from the 1543 edition of the *Fabrica*, with the ninth plate, produced from the original block. Also included in the volume were a full-size reproduction of the single woodcut from the *Venesection Letter* and the six sheets of the *Tabulae anatomicae*. The *Icones* thus became the only complete repository of the Vesalian illustrations.

But the story does not have a happy conclusion. During the Allied bombing of Munich during the Second World War, the wonderful woodblocks were tragically lost to the world forever.

32 Andreas Vesalius. *The Fabric of the Human Body. An Annotated Translation of the 1543 and 1555 Editions of "De humani corporis fabrica"*. Basel: Karger, 2013. 2 volumes.

Given the enormous significance of the *Fabrica*, it is extraordinary that Vesalius's *magnum opus* has only recently been translated into English in its entirety - four hundred and seventy years after its publication in Latin in 1543. Parts of the *Fabrica* had been published and cited in English prior to 2013, but never the whole text. With impeccable timing on the part of the Karger publishing house, the first full English translation of the *Fabrica* made its appearance last year – just in time to coincide with the five hundredth anniversary of the birth of Vesalius. Appropriately, the book was published in Basel.

The principal reason for such a long delay undoubtedly lies in the problems of translating Vesalius's Latin, which, as mentioned above, was notoriously verbose and difficult to comprehend. The translator's introduction by

Daniel H. Garrison discusses the characteristics of Vesalius's Latin, and the difficulties involved with translating it into modern English, while attempting to retain as much of the flavour of the original as possible.

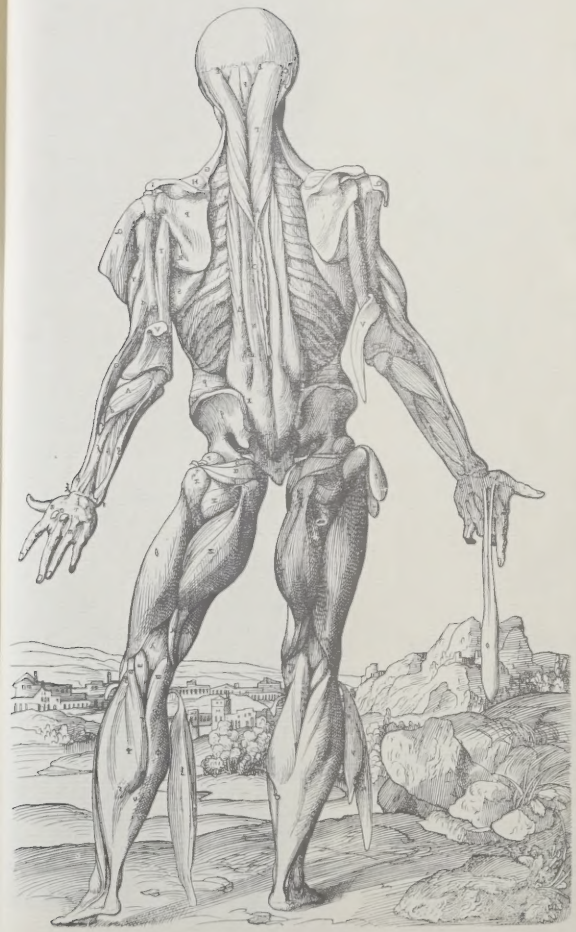
The two enormous volumes are brilliantly conceived and beautifully printed, and are provided with a wealth of illuminating scholarly apparatus. Daniel H. Garrison and Malcolm H. Hast are to be highly commended for their diligence over many years in preparing the translation of this complex book. The translation is based on the 1543 edition of the *Fabrica*, collated against the 1555 edition, and Vesalius's own annotated copy of the 1555 edition on display in this exhibition. A system of colour-coded typography is employed to highlight the textual differences between the three versions, which are displayed either in footnotes, or in the appendix. Other typographical features provide an elaborate system of cross referencing. Icons of Vesalius's head refer the reader to the original Latin text of 1543. To assist the reader in understanding the anatomical terms used, certain words are printed in golden brown type within brackets to refer the user to modern anatomical dictionaries. Thumbnails of the illustrations in the margins signal other places in the text where a particular feature is discussed.

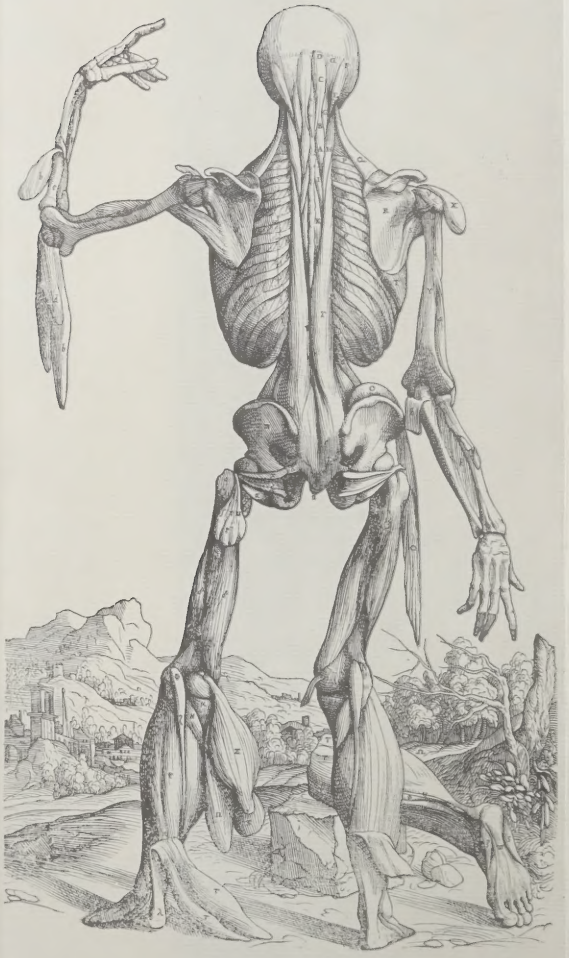
The prefatory matter provides a rich mine of information about Vesalius and the *Fabrica*. The excellent Historical Introduction by Vivian Nutton, and the Introduction to Book Two by Nancy C. Siraisi provide thorough and succinct accounts on Vesalius and on the background, production, reception, and significance of the *Fabrica*.

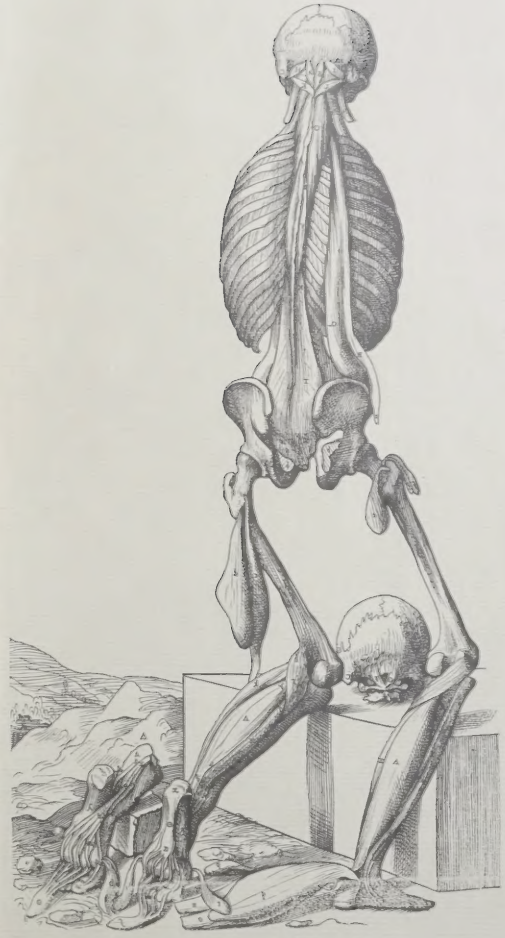
33 George Stanley Terence Cavanagh. *The panorama of Vesalius : a 'lost' design from Titian's studio.* Athens, Ga. : Sacrum Press, 1996.

In 1902 it was first noticed that the backgrounds to the fourteen muscle men formed a continuous panorama. Cavanagh experimented with the figures by photographing them and developing the negatives in reverse. The first two plates were transposed in order to maintain the correct sequence.

The muscle men are here joined and arranged to form two panoramic sequences: "The front views", and "The back views."







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